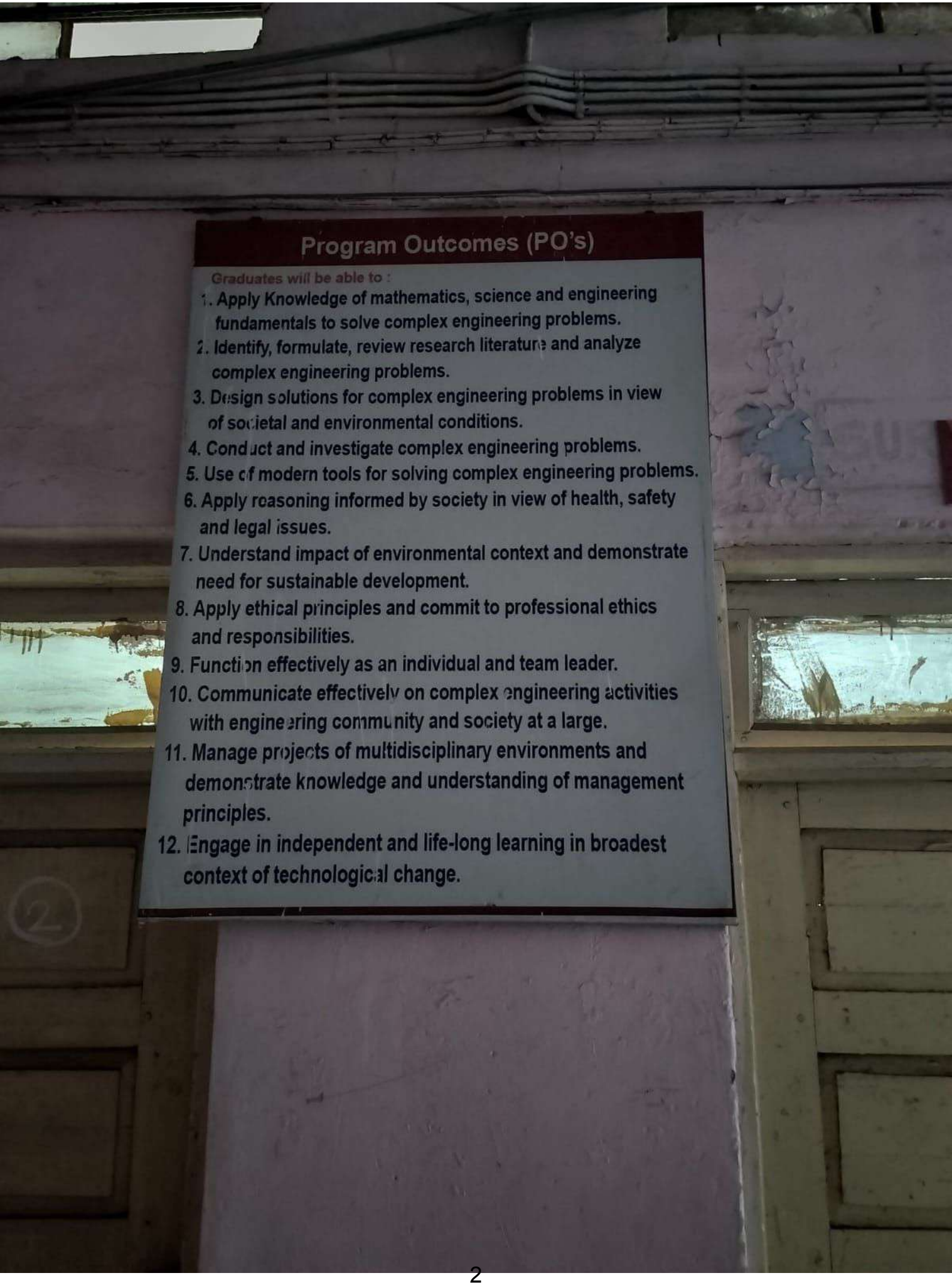
Shri Tuljabhavani Temple Trust's
SHRI TULJABHAVANI COLLEGE OF ENGINEERING,
TULJAPUR – 413601 Dist. : Osmanabad
E-mail : stbcet@gmail.com Website : www.stbcet.org.in

AQAR Report data for A.Y. 2022-23

2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution are stated and displayed on website and communicated to teachers and students		
Sr. No.	Description of Attachment	Page No.
1	PO's flex photographs of each department	02 to 06
2	Screen shot of college website	07 to 12
3	Notices displayed on departmental notice board	13 to 91
4	Last page of attendance muster	92-93


Program Outcomes (PO's)
Graduates will be able to :
1. Apply Knowledge of mathematics, science and engineering fundamentals to solve complex engineering problems.
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9. Function effectively as an individual and team leader.
10. Communicate effectively on complex engineering activities with engineering community and society at a large.
11. Manage projects of multidisciplinary environments and demonstrate knowledge and understanding of management principles.
12. Engage in independent and life-long learning in broadest context of technological change.

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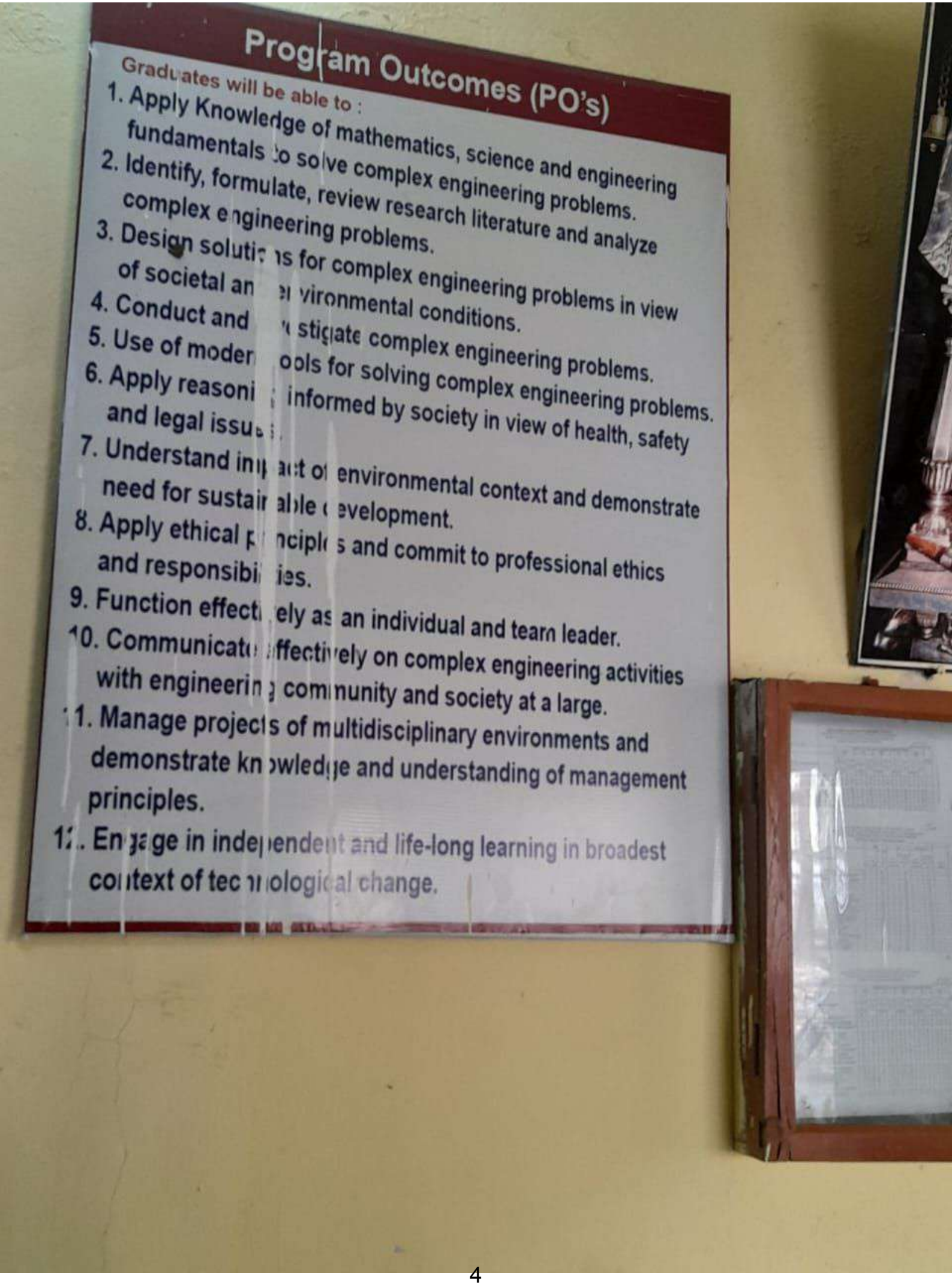
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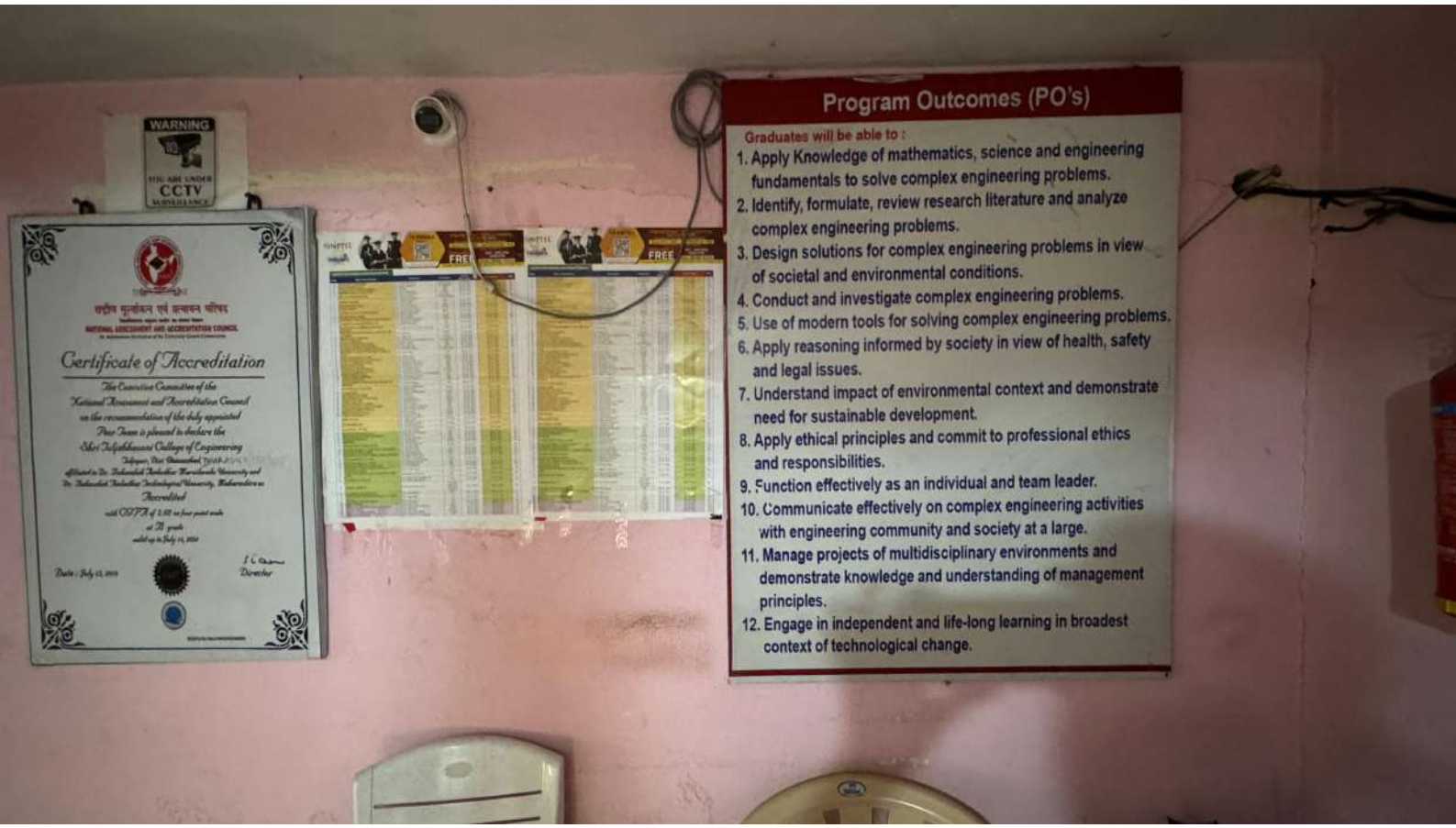
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CCTV
Certificate of Accreditation
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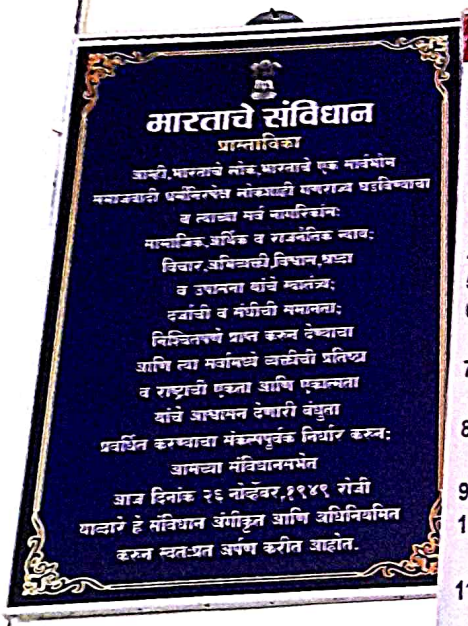

भारताचे संविधान

प्रास्ताविका

आम्ही,भारताचे लोक,भारताचे एक सार्वभौम
समाजवादी धर्मनिरपेक्ष लोकशाही गणराज्य घडविण्याचा
व त्याच्या सर्व नागरिकांना:
सामाजिक,आर्थिक व राजकीय न्याय;
विचार,अभिव्यक्ती,विश्वास,श्रद्धा
व उपासना यांचे स्वातंत्र्य;
दर्जाची व संधीची समानता;
निश्चितपणे प्राप्त करून देण्याचा
आणि त्या सर्वांमध्ये व्यक्तीची प्रतिष्ठा
व राष्ट्राची एकता आणि एकात्मता
यांचे आश्वासन देणारी बंधुता
प्रवर्धित करण्याचा संकल्पपूर्वक निर्धार करून:
आमच्या संविधानसभेत
आज दिनांक २६ नोव्हेंबर,१९४९ रोजी
याद्वारे हे संविधान अंगीकृत आणि अधिनियमित
करून स्वतःप्रत अर्पण करीत आहोत.

Program Outcomes (PO's)

Graduates will be able to :

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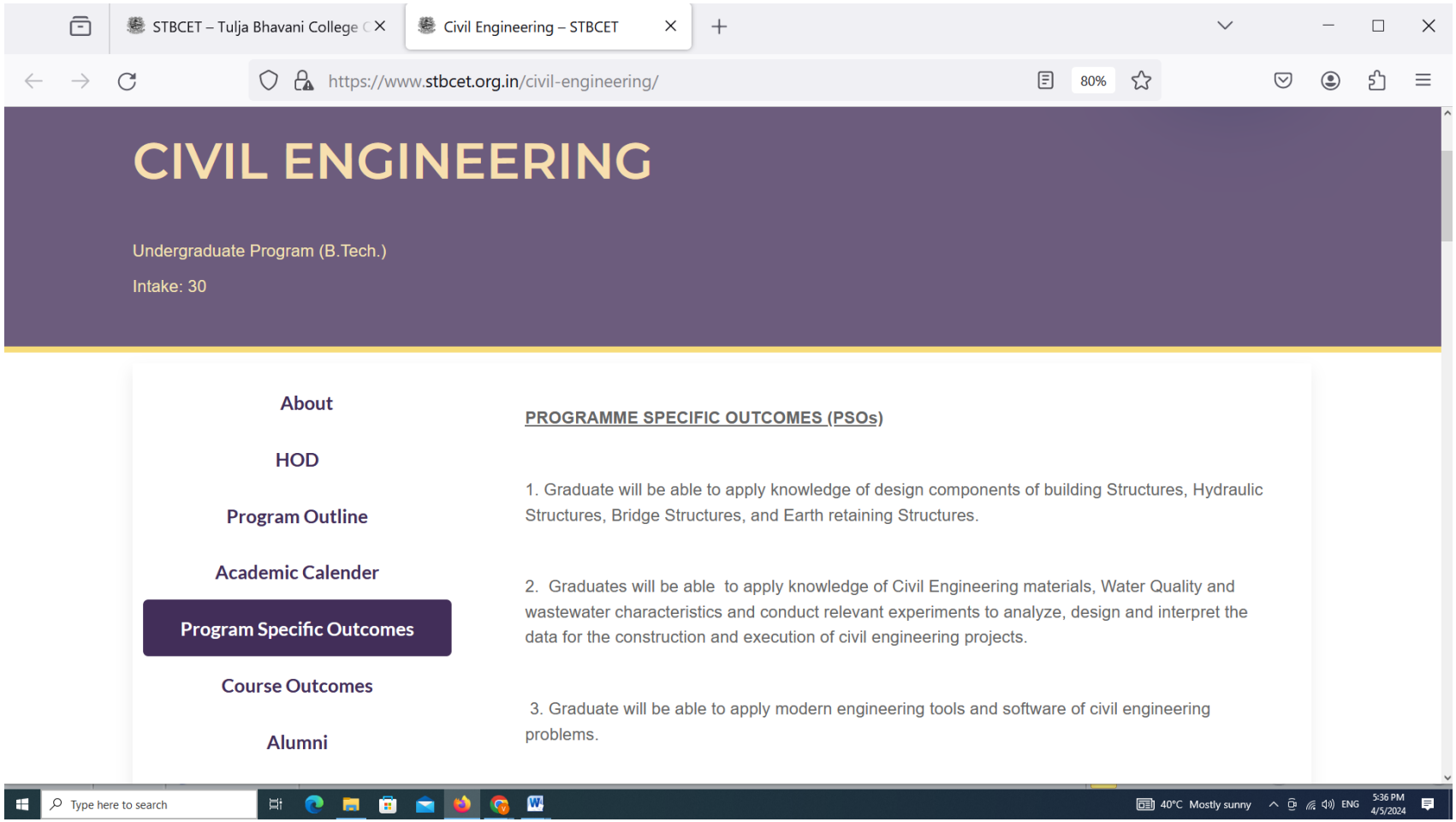
STBCET – Tulja Bhavani College
Civil Engineering – STBCET
https://www.stbcet.org.in/civil-engineering/
80%
CIVIL ENGINEERING
Undergraduate Program (B.Tech.)
Intake: 30
About
HOD
Program Outline
Academic Calender
Program Specific Outcomes
Course Outcomes
Alumni
PROGRAMME SPECIFIC OUTCOMES (PSOs)
1. Graduate will be able to apply knowledge of design components of building Structures, Hydraulic Structures, Bridge Structures, and Earth retaining Structures.
2. Graduates will be able to apply knowledge of Civil Engineering materials, Water Quality and wastewater characteristics and conduct relevant experiments to analyze, design and interpret the data for the construction and execution of civil engineering projects.
3. Graduate will be able to apply modern engineering tools and software of civil engineering problems.
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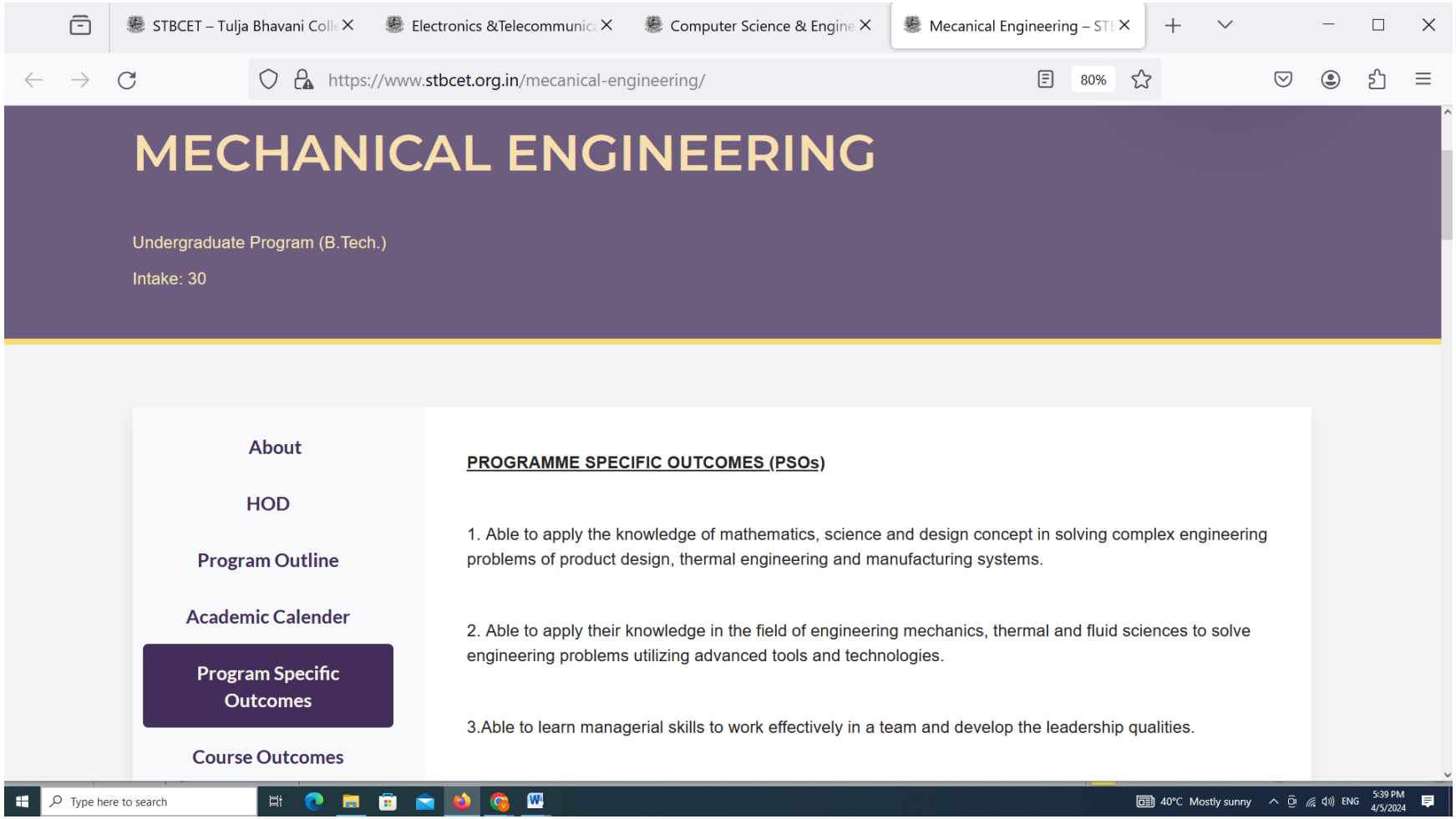
STBCET – Tulja Bhavani Coll
Electronics &Telecommunic
Computer Science & Engine
Mecanical Engineering – STE
https://www.stbcet.org.in/mecanical-engineering/
80%
MECHANICAL ENGINEERING
Undergraduate Program (B.Tech.)
Intake: 30
About
HOD
Program Outline
Academic Calender
Program Specific Outcomes
Course Outcomes
PROGRAMME SPECIFIC OUTCOMES (PSOs)
1. Able to apply the knowledge of mathematics, science and design concept in solving complex engineering problems of product design, thermal engineering and manufacturing systems.
2. Able to apply their knowledge in the field of engineering mechanics, thermal and fluid sciences to solve engineering problems utilizing advanced tools and technologies.
3.Able to learn managerial skills to work effectively in a team and develop the leadership qualities.
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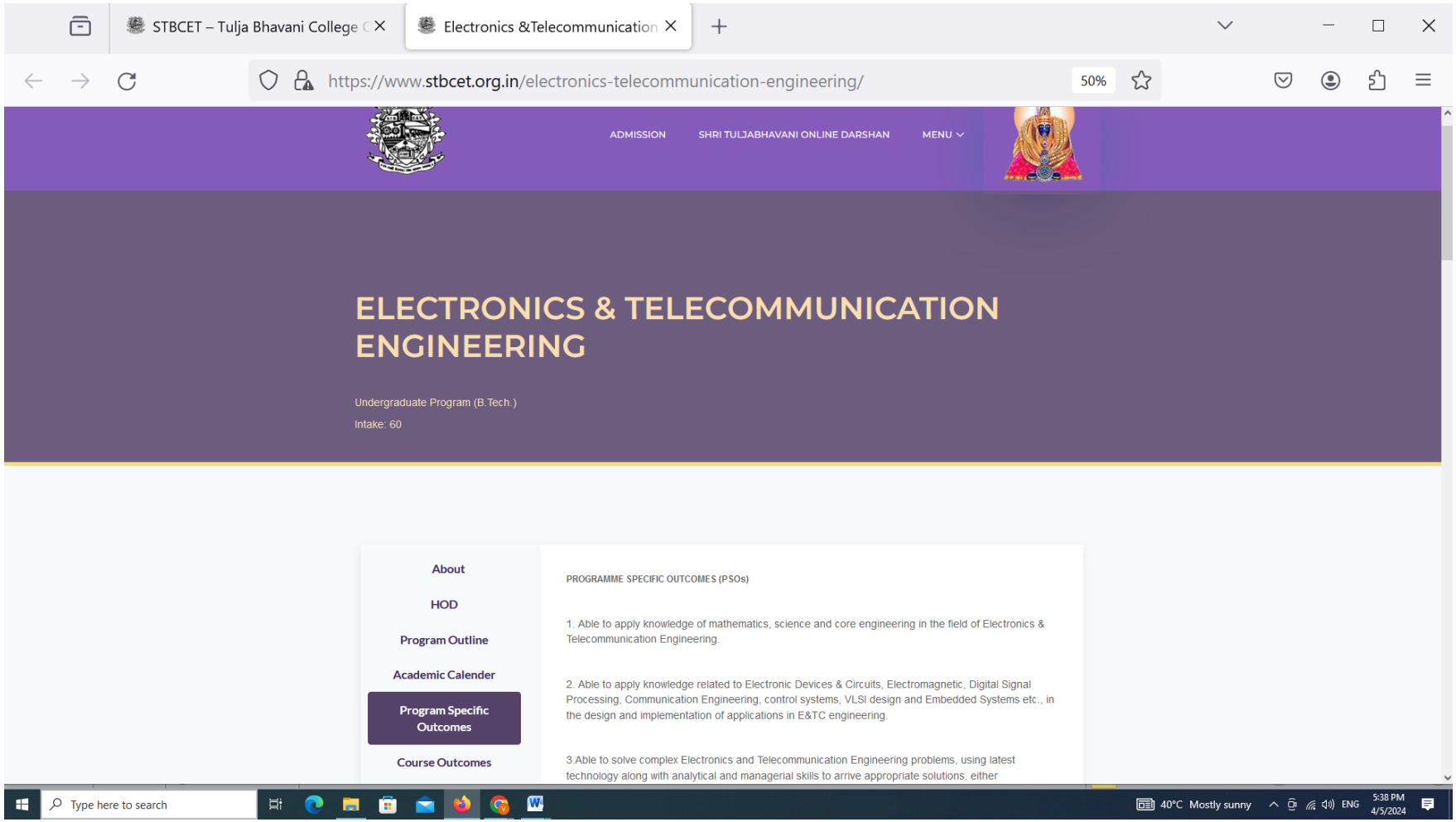
STBCET – Tulja Bhavani College
Electronics &Telecommunication
https://www.stbcet.org.in/electronics-telecommunication-engineering/
50%
ADMISSION
SHRI TULJABHAVANI ONLINE DARSHAN
MENU
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Undergraduate Program (B.Tech.)
Intake: 60
About
HOD
Program Outline
Academic Calender
Program Specific Outcomes
Course Outcomes
PROGRAMME SPECIFIC OUTCOMES (PSOs)
1. Able to apply knowledge of mathematics, science and core engineering in the field of Electronics & Telecommunication Engineering.
2. Able to apply knowledge related to Electronic Devices & Circuits, Electromagnetic, Digital Signal Processing, Communication Engineering, control systems, VLSI design and Embedded Systems etc., in the design and implementation of applications in E&TC engineering.
3.Able to solve complex Electronics and Telecommunication Engineering problems, using latest technology along with analytical and managerial skills to arrive appropriate solutions, either
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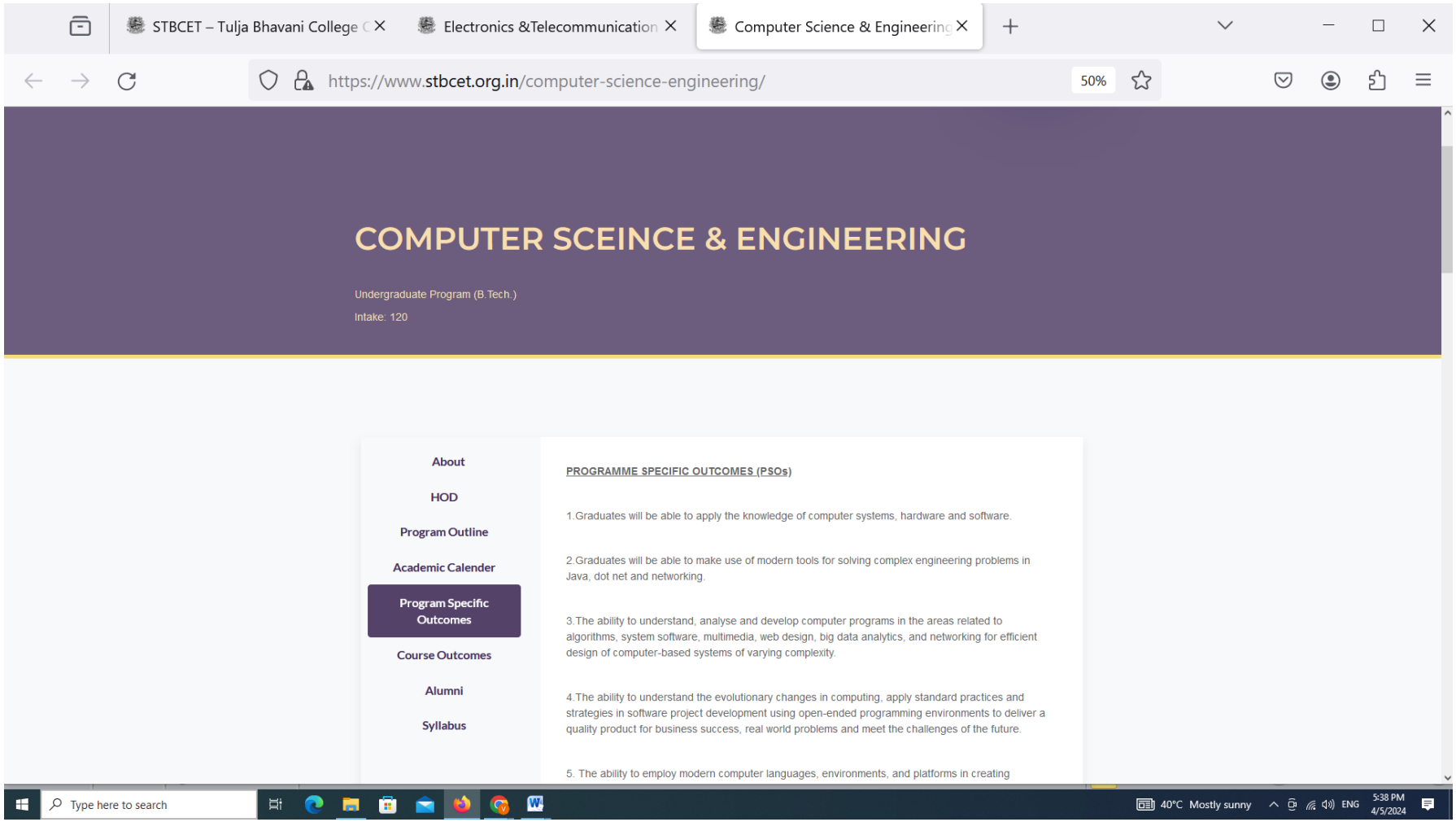
STBCET – Tulja Bhavani College
Electronics &Telecommunication
Computer Science & Engineering
https://www.stbcet.org.in/computer-science-engineering/
50%
COMPUTER SCEINCE & ENGINEERING
Undergraduate Program (B.Tech.)
Intake: 120
About
HOD
Program Outline
Academic Calender
Program Specific Outcomes
Course Outcomes
Alumni
Syllabus
PROGRAMME SPECIFIC OUTCOMES (PSOs)
1.Graduates will be able to apply the knowledge of computer systems, hardware and software.
2.Graduates will be able to make use of modern tools for solving complex engineering problems in Java, dot net and networking.
3.The ability to understand, analyse and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.
4.The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future.
5. The ability to employ modern computer languages, environments, and platforms in creating
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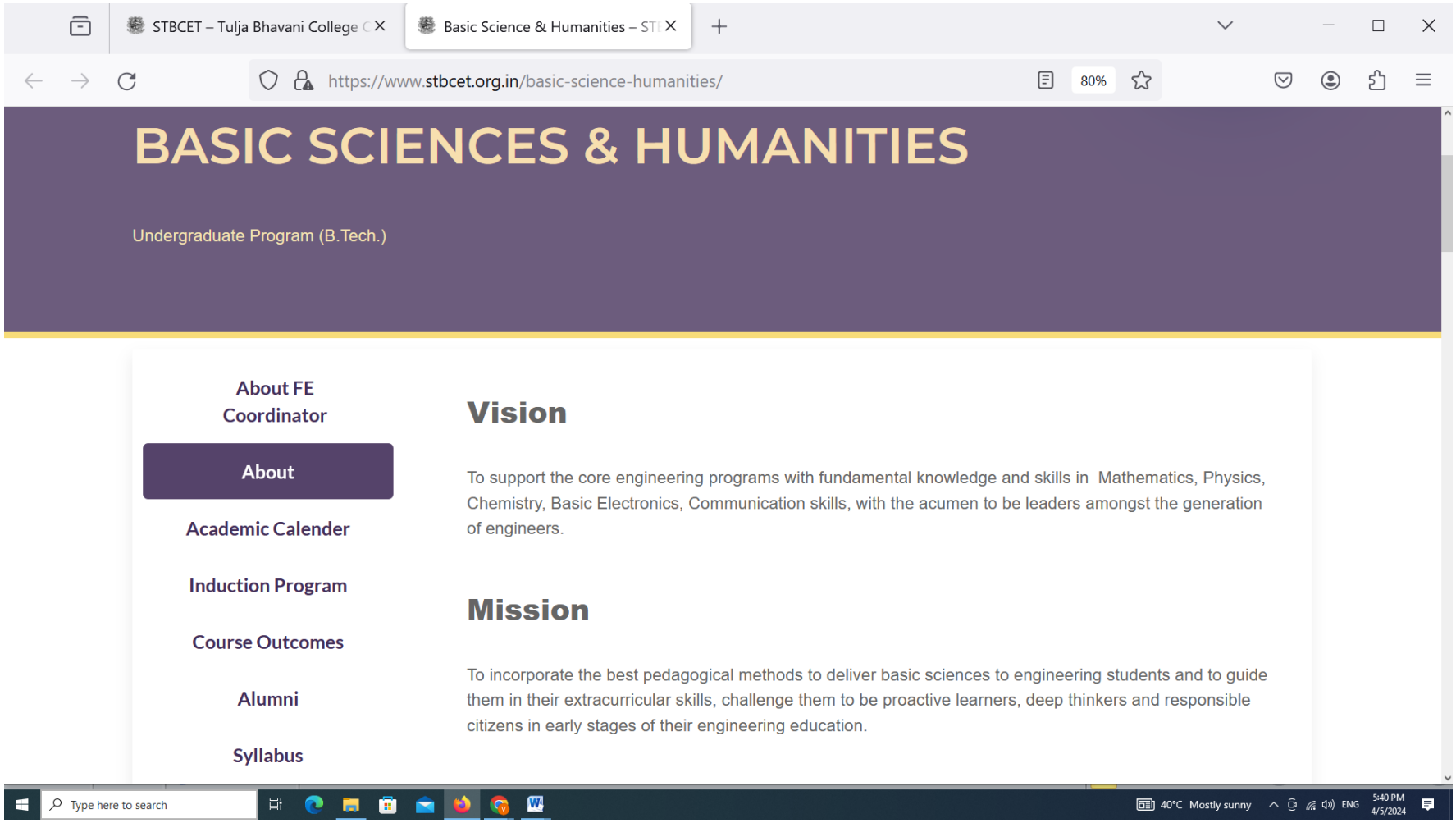
STBCET – Tulja Bhavani College
Basic Science & Humanities – ST
https://www.stbcet.org.in/basic-science-humanities/
80%
BASIC SCIENCES & HUMANITIES
Undergraduate Program (B.Tech.)
About FE Coordinator
About
Academic Calender
Induction Program
Course Outcomes
Alumni
Syllabus
Vision
To support the core engineering programs with fundamental knowledge and skills in Mathematics, Physics, Chemistry, Basic Electronics, Communication skills, with the acumen to be leaders amongst the generation of engineers.
Mission
To incorporate the best pedagogical methods to deliver basic sciences to engineering students and to guide them in their extracurricular skills, challenge them to be proactive learners, deep thinkers and responsible citizens in early stages of their engineering education.
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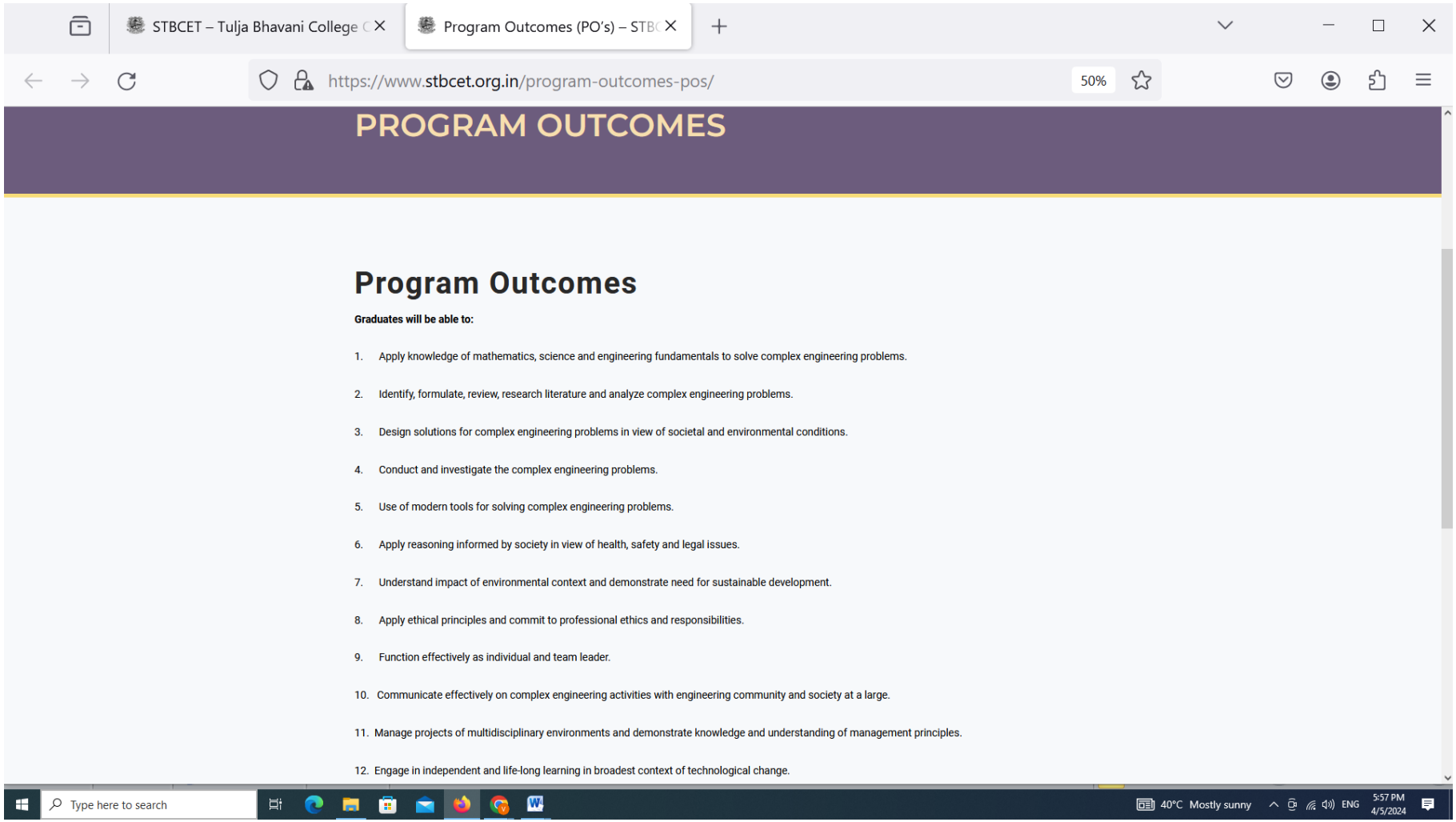
STBCET – Tulja Bhavani College
Program Outcomes (PO's) – STB
https://www.stbcet.org.in/program-outcomes-pos/
50%
PROGRAM OUTCOMES
Program Outcomes
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4/5/2024

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CIVIL ENGINEERING DEPRTMENT

PROGRAMME SPECIFIC OUTCOMES (PSOs)

1.0 Graduate will be able to apply knowledge of design components of building Structures, Hydraulic Structures, Bridge Structures, and Earth retaining Structures.

2.0 Graduates will be able to apply knowledge of Civil Engineering materials, Water Quality and wastewater characteristics and conduct relevant experiments to analyze, design and interpret the data for the construction and execution of civil engineering projects.

3.0 Graduate will be able to apply modern engineering tools and software of civil engineering problems.

MECHANICAL ENGINEERING DEPRTMENT

PROGRAMME SPECIFIC OUTCOMES (PSOs)

Graduates will be:

PSO 1: Able to apply the knowledge of mathematics, science and design concept in solving complex engineering problems of product design, thermal engineering and manufacturing systems

PSO 2: Able to apply their knowledge in the field of engineering mechanics, thermal and fluid sciences to solve engineering problems utilizing advanced tools and technologies.

PSO 3: Able to learn managerial skills to work effectively in a team and develop the leadership qualities.

ELECTRONICS AND TELECOMMUNICATION ENGINEERING DEPARTMENT

PROGRAMME SPECIFIC OUTCOMES (PSOs)

Graduates will be:

PSO 1: Able to apply knowledge of mathematics, science and core engineering in the field of Electronics & Telecommunication Engineering.

PSO 2: Able to apply knowledge related to Electronic Devices & Circuits, Electromagnetic, Digital Signal Processing, Communication Engineering, control systems, VLSI design and Embedded Systems etc., in the design and implementation of applications in E&TC engineering.

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PSO 3: Able to solve complex Electronics and Telecommunication Engineering problems, using latest technology along with analytical and managerial skills to arrive appropriate solutions, either independently or in team.

COMPUTER SCIENCE ENGINEERING DEPRTMENT

PROGRAMME SPECIFIC OUTCOMES (PSOs)

1. Graduates will be able to apply the knowledge of computer systems, hardware and software

2. Graduates will be able to make use of modern tools for solving complex engineering problems in Java, dot net and networking

3. The ability to understand, analyse and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

4. The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future.

5. The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, lifelong learning and a zest for higher studies and also to act as a good citizen by inculcating in them moral values & ethics.

On completion of the course, the students will be able to:
CO1: Perform the stress-strain analysis.
CO2: Draw force distribution diagrams for members and determinate beams.
CO3: Find deflections in determinant beams.
CO4: Visualize force deformation behavior of bodies.

Course Outcomes of Civil engineering department						
	1. Engineering Mathematics	**2. Mechanics of solides**	**3. Hydraulic -I**	**4.Surveying-I**	**5. Building Constructions**	
S.Y. B.Tech Sem-I	On completion of the course, student will be able to formulate and solve mathematical model of civil engineering phenomena in field of structures, survey, fluid mechanics and soil mechanics	On completion of the course, the students will be able to: CO1: Perform the stress-strain analysis. CO2: Draw force distribution diagrams for members and determinate beams. CO3: Find deflections in determinant beams. CO4: Visualize force deformation behavior of bodies.	On completion of the course, the students will be able to: CO1: Calibrate the various flow measuring devices. CO2: Determine the properties of fluid and pressure and their measurement. CO3: Understand fundamentals of pipe flow, losses in pipe and analysis of pipe network. CO4: Visualize fluid flow phenomena observed in Civil Engineering systems.	On completion of the course, the students will be able to: CO1: Perform measurements in linear/angular methods. CO2: Perform plane table surveying in general terrain. CO3: Know the basics of leveling and theodolite survey in elevation and angular measurements	1On completion of the course, students will be able to: CO1: Understand types of masonry structures. CO2: Understand composition of concrete and effect of various parameters affecting strength. CO3: Comprehend components of building and there purposes. CO4: Comprehend the precast and pre-engineered building construction techniques.	

	1.Hydraulic -II	2.Engineering Geology	3.Structural Mechanics-I	4. Water Resources Engineering	5. Building Planning and Drawing	6. Environmental Engineering
SY. B.Tech PART II	On completion of the course, the students will CO1: Design open channel sections in a most economical way. CO2: Know about the non uniform flows in open channel and the characteristics of hydraulic jump. CO3: Understand application of momentum principle of impact of jets on plane	On completion of the course, the students will be able to: CO1: Recognize the different land forms which are formed by various geological agents. CO2: Identify the origin, texture and structure of various rocks and physical properties of mineral. CO3: Emphasize distinct geological structures which have influence on the civil engineering structure. CO4: Understand how the various geological conditions affect the design parameters of structures.	On completion of the course, the students will be able to: CO1: Describe the concept of structural analysis, degree of indeterminacy. CO2: Calculate slopes and deflection at various locations for different types of beams. CO3: Identify determinate and indeterminate trusses and calculate forces in the members of trusses Perform the distribution of the moments the in continuous beam and frame	On completion of the course, the students will be able to: CO1: Understand need of Irrigation in India and water requirement as per farming practice in India. CO2: Understand various irrigation structures and schemes. CO3: Develop basis for design of irrigation schemes.	On completion of the course, the students will be; CO1: To plan buildings considering various principles of planning and byelaw of governing body. CO2: Comprehend various utility requirements in buildings CO3 : Understand various techniques for good acoustics.	On completion of the course, the students will be able to: CO1: Apply the water treatment concept and methods. CO2: Prepare basic process designs of water and wastewater treatment plants. CO3: Apply the wastewater treatment concept and methods. CO4: Apply the solid waste management concepts.

	1.Design of steel structure	2.Structural Mechanics -II	3. Geo Technical Engineering.	4. Concrete Technology	5. Project Management	6. Advanced Environmental Engg.
TY. B.Tech PART I	On completion of the course, the students will be able to:	On completion of the course, the students will be able to:	On completion of the course, the students will be able to:	On completion of the course, the students will be able to:	On completion of the course, the students will be able to:	:On completion of the course, the students will be able to:
	CO1: Identify and compute the design loads and the stresses developed in the steel member.	CO1: Have a basic understanding of matrix method of analysis and will be able to analyze the determinant structure.	CO1: Understand different soil properties and behavior	CO1: Understand the various types and properties of ingredients of concrete.	1. Understand various steps in project Management, different types of charts.	1. Determine the sewage characteristics and design various sewage treatment plants.
	CO2: Analyze and design the various connections and identify the potential failure modes.	CO2: Have a basic understanding of the principles and concepts related to finite difference and finite element methods	CO2: Understand stresses in soil and permeability and seepage aspects.	CO2: Understand effect of admixtures on the behavior of the fresh and hardened concrete.	2. Construct network by using CPM and PERT method. Determine the optimum duration of project with the help of various time estimates.	2. Understand municipal water and wastewater treatment system design and operation.
	CO3: Analyze and design various tension, compression and flexural members.	CO3: Have a basic understanding of concept of influence line	CO3: Develop ability to take up soil design of various foundations	CO3: Formulate concrete design mix for various grades of concrete.	3. Know the concept of engineering economics, economic comparisons, and linear break even analysis problems.	3. Apply environmental treatment technologies and design processes for treatment of industrial waste water.
	CO4: Understand provisions in relevant BIS Cod				4. Understand the concept of total quality Management including Juran and Deming's philosophy.	4. Understand the rural sanitation schemes.

	1. Design of RC Structures	2. Foundation Engineering	3. Transportation Engineering	4. Structural Audit	5. Environmental Impact Assessment	6. Indian Constitution
T.Y. B.Tech PART II	On completion of the course, the students will be able to comprehend the various design philosophies used in design of reinforced concrete. Analyze and design the reinforced concrete sections using working stress and limit state method.	On completion of the course, the students will be able to: To predict soil behavior under the application of loads and come up with appropriate solutions to foundation design queries. Analyze the stability of slope by theoretical and graphical methods. Analyze the results of in-situ tests and transform measurements and associated uncertainties Synthesize the concepts of allowable stress design, appropriate factors of safety, margin of safety, and	On completion of the course, the students will be able to: Comprehend various types of transportation systems and their history of the development Comprehend to various types of pavements Design the pavements by considering various aspects associated with traffic safety measures.	Upon completion of the course the students will be able to: • Gain the knowledge of Bye laws, procedure of Structural audit and study the typical problems in structures. • • • • • Aware of causes and types of deterioration in structures. Develop skills for use of various Nondestructive tests required during auditing of structures. Strength evaluation of existing structures. Acquire knowledge of legal procedure to conduct structural audits. Prepare a Structural audit report.	: On completion of the course, the students will be able to: CO1: Identify the environmental attributes to be considered for the EIA study CO2: Formulate objectives of the EIA studies	On completion of the course, the students will be able to: Know the important consitution GOV. Become good citizen and no their fundamental rights dueties and principals Learn above the rule of PM prisident concual of miniater and local administration

	1.Design Of concrete strure-II	2.Infra structure Engineering	3.Water Resources Engg.	4.Professional Practices	5 Elective -IV Construction Techniques	6 Elective -V Town & Urban Planning
	On completion of the course, the students will be;	On completion of the course, the students will be able to:	On completion of the course, the students will be able to:	On completion of the course, the students will be able to:	On completion of the course, the students will be able to:	: Upon completion of the course the students will be able to:
B.Tech Civil Engg. PART I	Able to identify the behavior, analyze and design of the beam sections subjected to torsion.	Know about the basics and design of various components of railway engineering	CO1: Understand need of Irrigation in India and water requirement as per farming practice in India.	Understand the importance of preparing the types of estimates under different conditions for various	1. Understand the planning of new project with site accessibility and services required.	1. Understand town and Urban planning and their essential attributes
	Able to analyze and design of axially and eccentrically loaded column and construct the interaction diagram for them.	Understand the types and functions of tracks, junctions and railway stations.	CO2: Understand various irrigation structures and schemes.	Know about the rate analysis and bill preparations and to study about the specification writing.	2. Comprehend the various civil construction equipment's.	2. Identify elements of planning and regulations of the same
	Understand various concepts, systems and losses in pre-stressing.	Know about the aircraft characteristics, planning and components of airport	CO3: Develop basis for design of irrigation schemes	Know the various types of contract, accounts in PWD, methods for initiating the works in PWD and tendering.	3. Familiar with layout of RMC plant, production, capacity and operation process.	3. Implement guidelines provided by standard authorities
	Able to analyze and design the rectangular and symmetrical I-section pre-stressed beam/girders	Understand the types and components of docks and harbors		Understand the valuation of land and buildings, various methods and factors affecting valuation	4. Recognize various aspect of road construction, construction of diaphragm walls, railway track	The student shall understand the planning of town & Draw the plan of that town.

Btech. Civil PART II	**1. Maintainance & repair of concrete structures**	**2. Energy Efficiency Acoustics and Daylighting in Building**				
	1. To learn various distress & damages to concrete mesonary structures.	1. To expose to student to concept of functional degin of building for thermal aspectes and energy efficency.espcelly in tropical climets i.e in indian contacts				
	2. To understand the importance of maintainance of structure.					
	3 . To studey the various types & porperties of repair maintainance.					

Course Outcomes of Me

SY BTech Part I	**1. Engineering Mathematics –III**	**2. Fluid Mechanics**	**3. Thermodynamics**
	Students will be able to:	Students will be able to:	Students will be able to:
	1.Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.	1. Define fluid, define and calculate various properties of fluid	1. Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics.
	2.Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing.	2. Calculate hydrostatic forces on the plane and curved surfaces and explain stability of floating bodies	2. Study different laws of thermodynamics and apply these to simple thermal systems like balloon, piston-cylinder arrangement, compressor, pump, refrigerator, heat exchanger, etc. to study energy balance.
	3.Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative	3. Explain various types of flow. Calculate acceleration of fluid particles	3. Study various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes.
	4. Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields.	4.Apply Bernoulli's equation and Navier-Stokes equation to simple problems in fluid mechanics	4. Apply availability concept to non-flow and steady flow type systems.

	5. Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.	5. Explain laminar and turbulent flows on flat plates and through pipes	5. Represent phase diagram of pure substance (steam) on different thermodynamic planes like p-v, T-s, h-s, etc. Show various constant property lines on them.
		6. Explain and use dimensional analysis to simple problems in fluid mechanics. Understand boundary layer, drag and lift	6. Explain and use dimensional analysis to simple problems in fluid mechanics. Understand boundary layer, drag and lift

SY BTech Part II	**1. Manufacturing Processes-I**	**2. Theory of Machines- I**	**3. Basic Human Rights**
	Students will be able to:	Students will be able to:	Students will be able to:
	1. Identify castings processes, working principles and applications and list various defects in metal casting	1. Define basic terminology of kinematics of mechanisms	1. Understand the history of human rights.
	2. Understand the various metal forming processes, working principles and applications	2.Classify planar mechanisms and calculate its degree of freedom	2.Learn to respect others caste, religion, region and culture.
	3. Classify the basic joining processes and demonstrate principles of welding, brazing and soldering.	3.Perform kinematic analysis of a given mechanism using ICR and RV methods	3.Be aware of their rights as Indian citizen

	4. Study center lathe and its operations including plain, taper turning, work holding devices and cutting tool.	4. Perform kinematic analysis of a given mechanism analytically using vector or complex algebra method	4.Understand the importance of groups and communities in the society.
	5. Understand milling machines and operations, cutters and indexing for gear cutting.	5. Perform kinematic analysis of slider crank mechanism using Klein's construction and analytical approach	5. Realize the philosophical and cultural basis and historical perspectives of human rights.
	6. Study shaping, planing and drilling, their types and related tooling's		6. Make them aware of their responsibilities towards the nation.

	1. Heat Transfer	**2. Machine Design - I**	**3.Theory of Machines - II**
	Students will be able to:	Students will be able to:	Students will be able to:
	1. Explain the laws of heat transfer and deduce the general heat conduction equation and to explain it for 1-D steady state heat transfer in regular shape bodies	1. Formulate the problem by identifying customer need and convert into design specification	1. Identify and select type of belt and rope drive for a particular application
	2. Describe the critical radius of insulation, overall heat transfer coefficient, thermal conductivity and lumped heat transfer	2. Understand component behavior subjected to loads and identify failure criteria	2. Evaluate gear tooth geometry and select appropriate gears, gear trains
TY BTech			

Part I	3. Interpret the extended surfaces	3. Analyze the stresses and strain induced in the component	3. Define governor and select/suggest an appropriate governor
	4. Illustrate the boundary layer concept, dimensional analysis, forced and free convection under different conditions	4. Design of machine component using theories of failures	4. Characterize flywheels as per engine requirement
	5. Describe the Boiling heat transfer, mass transfer and Evaluate the heat exchanger and examine the LMTD and NTU methods applied to engineering problems	5. Design of component for finite life and infinite life when subjected to fluctuating load	5. Understand gyroscopic effects in ships, aeroplanes, and road vehicles.
	6. Explain the thermal radiation black body, emissivity and reflectivity and evaluation of view factor and radiation shields	6. Design of components like shaft, key, coupling, screw and spring	6. Understand free and forced vibrations of single degree freedom systems

	1.Manufacturing Processes - II	**2. Machine Design - II**	**3. IC Engines**
	Students will be able to:	Students will be able to:	Students will be able to:
	1. Understand the process of powder metallurgy and its applications	1. Define function of bearing and classify bearings.	1. Understand various types of I.C. Engines and Cycles of operation.

TY BTech Part II	2. Calculate the cutting forces in orthogonal and oblique cutting	2. Understanding failure of bearing and their influence on its selection	2. Analyze the effect of various operating variables on engine performance
	3.Evaluate the machinability of materials	3.Classify the friction clutches and brakes and decide the torque capacity and friction disk parameter	3. Identify fuel metering and fuel supply systems for different types of engines
	4. Understand the abrasive processes	4. Understand normal and abnormal combustion phenomena in SI and CI engines	4. Understand normal and abnormal combustion phenomena in SI and CI engines
	5. Explain the different precision machining processes	5.Select materials and configuration for machine element like gears.	5.Evaluate performance Analysis of IC Engine and Justify the suitability of IC Engine for different application
	6. Design jigs and fixtures for given application	6. Design thickness of pressure vessel using thick and thin criteria	6. Understand the conventional and non-conventional fuels for IC engines and effects of emission formation of IC engines, its effects and the legislation standards

BTech Part I	**1. Mechatronics**	**2. CAD/CAM**	**3. Manufacturing Processes - III**
	Students will be able to:	Students will be able to:	Students will be able to:
	1. Define sensor, transducer and understand the applications of different sensors and transducers	1. List and describe the various input and output devices for a CAD work station	1. Differentiate clearly between NC and CNC machines
	2. Explain the signal conditioning and data representation techniques	2. Carry out/calculate the 2-D and 3-D transformation positions (Solve problems on 2-Dand 3-D transformations)	2. Prepare and execute a part program for producing a given product
	3. Design pneumatic and hydraulic circuits	3. Describe various CAD modeling techniques with their relative advantages and limitations	3. Select appropriate non-traditional machining process for a given application
	4. Write a PLC program using Ladder logic for a given application	4. Describe various CAD modeling techniques with their relative advantages and limitations	4. Compare different surface coating techniques
	5. Understand applications of microprocessor and micro controller	5. Develop NC part program for the given component, and robotic tasks	5. Explain different rapid prototyping techniques

	6. Analyse PI, PD and PID controllers for a given application	6. Describe the basic Finite Element procedure	6. Illustrate the working principle of various micro-manufacturing processes

Btech Part II	**1. Project Stage – II/Internship and Project**
	Students will be able to:
	1. State the aim and objectives for this stage of the project
	2. Construct and conduct the tests on the system/product
	3. Analyze the results of the tests.
	4. Discuss the findings, draw conclusions, and modify the system/product, if necessary.

chanical engineering department

4. Materials Science and Metallurgy	**5. Machine Drawing and CAD Lab**	**6. Basic Human Rights**
Students will be able to:	Students will be able to:	Students will be able to:
1. Study various crystal structures of materials	1. Interpret the object with the help of given sectional and orthographic views.	1. Understand the history of human rights.
2. Understand mechanical properties of materials and calculations of same using appropriate equations	2. Construct the curve of intersection of two solids	2.Learn to respect others caste, religion, region and culture.
3. Evaluate phase diagrams of various materials	3. Draw machine element using keys, cotter, knuckle, bolted and welded joint	3.Be aware of their rights as Indian citizen
4. Suggest appropriate heat treatment process for a given application	4. Assemble details of any given part. i. e. valve, pump , machine tool part etc.	4.Understand the importance of groups and communities in the society.

5. Prepare samples of different materials for metallograp	5. Represent tolerances and level of surface finish on production drawings	5. Realize the philosophical and cultural basis and historical perspectives of human rights.
6. Recommend appropriate NDT technique for a given application	6. Understand various creating and editing commands in Auto Cad	6. Make them aware of their responsibilities towards the nation.

4. Strength of Materials	**5. Sheet Metal Engineering**
Students will be able to:	Students will be able to:
1.State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E, μ, etc.	1. Recognize common manufacturing processes of Sheet Metal Fabrication
2.Recognize the stress state (tension, compression, bending, shear, etc.) and calculate the value of stress developed in the component in axial/eccentric static and impact load cases.	2. Understand the principles of design and fabricate of sheet metal products and recognize common material used in the industry
3. SDistinguish between uniaxial and multiaxial stress situation and calculate principal stresses, max. shear stress, their planes and max. normal and shear stresses on a given plane.	3. Distinguish Shearing, Drawing and Pressing etc. processes.

4.Analyze given beam for calculations of SF and BM	4.Know types of dies and formability
5. Calculate slope and deflection at a point on cantilever /simply supported beam using double integration, Macaulay's , Area-moment and superposition methods	5. Select mechanical or hydraulic presses for the given process
6. Differentiate between beam and column and calculate critical load for a column using Euler's and Rankine's formulae	

4. Automobile Engineering	**5. Renewable Energy Sources**	**6. Applied Thermodynamics**
Students will be able to:	Students will be able to:	Students will be able to:
1. Identify the different parts of the automobile.	1. Identify the different parts of the automobile.	1. Define the terms like calorific value of fuel, stoichiometric air-fuel ratio, excess air, equivalent evaporation, boiler efficiency, etc. Calculate minimum air required for combustion of fuel.
2. Explain the working of various parts like engine, transmission, clutch, brakes etc.,	2. Explain the working of various parts like engine, transmission, clutch, brakes etc.,	2. Study and Analyze gas power cycles and vapour power cycles like Otto, Diesel, dual, Joule and Rankine cycles and derive expressions for the performance parameters like thermal efficiency, Pm

3. Demonstrate various types of drive systems.	3. Demonstrate various types of drive systems.	3. Classify various types of boiler, nozzle, steam turbine and condenser used in steam power plant.
4. Apply vehicle troubleshooting and maintenance procedures.	4. Apply vehicle troubleshooting and maintenance procedures.	4. Classify various types of IC engines. Sketch the cut section of typical diesel engine and label its components. Define the terms like TDC, BDC, rc, etc.
5. Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications.	5. Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications.	5. Draw P-v diagram for single-stage reciprocating air compressor, with and without clearance volume, and evaluate its performance. Differentiate between reciprocating and rotary air compressors.
6. Evaluate future developments in the automobile technology	6. Evaluate future developments in the automobile technology	

4. IC Engines	**5. Robotics**	**6. Quantitative Techniques in Project Management**
Students will be able to:	Students will be able to:	Students will be able to:
1. Understand the geometry of single point cutting tool and its effect.	1.List the various components of a typical Robot, grippers, sensors, drive system and describe their functions	1. Define and formulate research models to solve real life problems for allocating limited resources by linear programming.

2. Design jig and fixture.	2.Calculate the word to joint and joint to word coordinates using forward and reverse transformations	2. Apply transportation and assignment models to real life situations
3. Understand various press tool opeation and design cutting and forming dies.	3.Calculate the gripper forces, drive sizes, etc.	3. Apply queuing theory for performance evaluation of engineering and management systems
	4. Develop simple robot program for tasks such as pick and place, arc welding, etc. using some robotic language such as VAL-II, AL, AML, RAIL, RPL, VAL	4. Apply the mathematical tool for decision making regarding replacement of items in real life.
	5. Evaluate the application of robots in applications such as Material Handling, process operations and Assembly and inspection	5. Determine the EOQ, ROP and safety stock for different inventory models.
	6. Discuss the implementation issues and social aspects of robotics	6. Construct a project network and apply CPM and PERT method.

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4. Elective - Refrigeration and Air Conditioning	**5. Intellectual Property Rights**	**6. Project Stage - I**
Students will be able to:	Students will be able to:	Students will be able to:
1. Understand the basic thermodynamic cycles in refrigeration.	1. State the basic fundamental terms such as copyrights, Patents, Trademarks etc.,	1. State the exact title of the project and problem definition
2. Understanding and analyzing modern variants of the vapor compression & absorption systems in refrigeration.	2. Interpret Laws of copy-rights, Patents, Trademarks and various IP registration Processes.	2. Explain the motivation, objectives and scope of the project
	3. Exhibit the enhance capability to do economic analysis of IP rights, technology and innovation related policy issues and firms commercial strategies	3. Review the literature related to the selected topic of the project
	4. Create awareness at all levels (research and innovation) to develop patentable technologies.	4. Design the mechanism, components of the system and prepare detailed drawings.
4. Understand the basic impulse and reactions turbines, their operating parameters and the effects of such parameters on their performance.	5. Apply trade mark law, copy right law, patent law and also carry out intellectual property audits.	5. Evaluate the cost considering different materials manufacturing processes

	6. Manage and safeguard the intellectual property and protect it against unauthorized use	

	Engg.Graphics
F.E.	Students will be able to:
	1) Enhancing imagination, visualization, presentation and interpretation skill.
	2)Introduce the student to the universal language and tool of communication of engneers.
	3) Make them thorough in understanding and using the various concepts-elements and grammar of Engineering Graphics.

Department of Electronics and Telecommunication Engineering
Course outcomes A.Y. 2022-23

	Engineering Mathematics -III	**Electronic Devices & Circuits**	**Digital Electronics**	**Electrical Machine and Instrumentation**	
	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :	1. Use the basic logic gates and various reduction techniques of digital logic circuit in detail.	1. The ability to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.	
	1. Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.	1. Comply and verify parameters after exciting devices by any stated method.	2. Design combinational and sequential circuits.	2. The skill to analyze the response of any electrical machine.	
	2. Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing.	2. Implement circuit and test the performance.	3. Design and implement hardware circuit to test performance and application.	3. The ability to troubleshoot the operation of an electrical machine.	
S.Y.-ETC PART-I	3. Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.	3. Analyze small signal model of FET and MOSFET.	4. Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.	4. The ability to select a suitable measuring instrument for a given application.	
	4. Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields.	4. Explain behavior of FET at low frequency.		5. The ability to estimate and correct deviations in measurements due to the influence of the instrument and due to the accuracy of the instrument.	
	5. Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.	5. Design an adjustable voltage regulator circuits.			

	Network Theory	Signals and Systems	Basic Human Rights	Probability Theory and Random Processes	Python Programming
	By completion of the Course the students will be able to :	**By completion of the Course the students will be able to :**	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :
	1. Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same.	1. Understand mathematical description and representation of continuous and discrete time signals and systems.	1. Students will be able to understand the history of human rights.	1. Understand representation of random signals	1. Experience with an interpreted Language.
	2. Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters.	2. Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.	2. Students will learn to respect others caste, religion, region and culture.	2. Investigate characteristics of random processes	2. To build software for real needs
	3. Identify issues related to transmission of signals, analyze different RLC networks.	3. Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.	3. Students will be aware of their rights as Indian citizen.	3. Make use of theorems related to random signals	3. Prior Introduction to testing software
S.Y.-ETC PART-II	4. Find technology recognition for the benefit of the society.	4. Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s- domain.	4. Students will be able to understand the importance of groups and communities in the society.	4. To understand propagation of random signals in LTI systems.	

	5. Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event.	5. Students will be able to realize the philosophical and cultural basis and historical perspectives of human rights.		
	6. Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.			
	7. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.			

Electromagnetic Field Theory	**Digital Signal Processing**	**Analog Communication**	**Analog Circuits**	**Artificial Intelligence and**
By completion of the Course the students will be able to :	By completion of the Course the students will be able to :	**By completion of the Course the students will be able to :**	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :
1. Understand characteristics and wave propagation on high frequency transmission lines	1. Understand use of different transforms and analyze the discrete time signals and systems.	1. Understand and identify the fundamental concepts and various components of analog communication systems. 2. Understand the concepts of modulation and demodulation techniques. 3. Design circuits to generate modulated and demodulated wave.	1. Understand the characteristics of IC and Op-Amp and identify the internal structure.	1. Identify the AI based problems.

	2. Carryout impedance transformation on TL	2. Realize the use of LTI filters for filtering different real world signals.	2. Understand the concepts of modulation and demodulation techniques.	2. Understand and identify various manufacturing techniques.	2. Apply techniques to solve the AI problems.
	3. Use sections of transmission line sections for realizing circuit elements	3. Capable of calibrating and resolving different frequencies existing in any signal.	3. Design circuits to generate modulated and demodulated wave.	3. Derive and determine various performances based parameters and their significance for Op-Amp.	3. Define learning and explain various logic inferences.
T.Y. ETC PART-I	4. Characterize uniform plane wave	4. Design and implement multistage sampling rate converter.	4. Equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance.	4. Comply and verify parameters after exciting IC by any stated method.	4. Discuss different learning techniques.
	5. Calculate reflection and transmission of waves at media interface	5. Design of different types of digital filters for various applications.	5. Understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase).	5. Analyze and identify the closed loop stability considerations and I/O limitations.	
	6. Analyze wave propagation on metallic waveguides in modal form		6. Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.	6. Analyze and identify linear and nonlinear applications of Op-Amp.	
	7. Understand principle of radiation and radiation characteristics of an antenna		7. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.	7. Understand and verify results (levels of V & I) with hardware implementation.	

			8. Implement hardwired circuit to test performance and application for what it is being designed.	
			9. Understand and apply the functionalities of PLL.	

	Antennas and Wave Propagation	Digital Communication	Microprocessor and Microcontroller	Computer Network	Employability & Skill Development
	By completion of the Course the students will be able :	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :	By completion of the Course the students will be able :	By completion of the Course the students will be able :
	1. Formulate the wave equation and solve it for uniform plane wave.	1. Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.	1. Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications.	1. To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.	1. Have skills and preparedness for aptitude tests.
	2. Analyze the given wire antenna and its radiation characteristics.	2. Perform the time and frequency domain analysis of the signals in a digital communication system.	2. Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles.	2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.	2. Be equipped with essential communication skills (writing, verbal and non-verbal)
	3. Identify the suitable antenna for a given communication system.	3. Select the blocks in a design of digital communication system.	3. Students can identify and formulate control and monitoring systems using microprocessors.	3. To be familiar with wireless networking concepts.	3. Master the presentation skill and be ready for facing interviews.
T.Y. ETC PART-II		4. Analyze Performance of spread spectrum communication system	4. Learn use of hardware and software tools.	4. To be familiar with contemporary issues in networking technologies.	4. Build team and lead it for problem solving.

		5. Develop interfacing to real world devices.	5. To be familiar with network tools and network programming.	
		6. Graduates will be able to design real time controllers using microcontroller-based system.	6. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component.	
		7. Learn importance of microcontroller in designing embedded application.	7. For a given problem related TCP/IP protocol developed the network programming.	
			8. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools	

	Microwave Theory and Techniques	**Embedded System Design**	**Consumer Electronics**	**Financial Management**	
	By completion of the Course the students will be able :	By completion of the Course the students will be able :	By completion of the Course the students will be able to :	By completion of the Course the students will be able :	
	1. Formulate the wave equation in wave guide for analysis.	1. Suggest design approach using advanced controllers to real-life situations.	1. List technical specification of electronics Audio system (microphone and speaker)	1. The students would be able to understand and define basic terminology used in finance and accounts	

B.Tech.(ETC) Part I	2. Identify the use of microwave components and devices in microwave applications.	2. Design interfacing of the systems with other data handling / processing systems.	2. Trouble shoots consumer electronics products like TV, washing machine and AC.	2. The students would be able to prepare& appraise Financial Statements and evaluate a company in the light of different measurement systems.	
	3. Understand the working principles of all the microwave tubes.	3. Appreciate engineering constraints like energy dissipation, data exchange speeds etc.	3. Identify and explain working of various color TV transmission blocks.	3. The students would be able to analyze the risk and return of alternative sources of financing.	
	4. Understand the working principles of all the solid state devices.	4. Get to know the hardware – software co design issues and testing methodology for embedded system.	4. Adjust various controls of color TV receiver and troubleshoot it.	4. Estimate cash flows from a project, including operating, net working capital, and capital spending.	
	5. Choose a suitable microwave tube and solid state device for a particular application.		5. Use various functions of Cam coder and shoot a video and take snapshots and save them in appropriate format	5. To estimate the required return on projects of differing risk ,to estimate the cash flows from an investment project, calculate the appropriate discount rate, determine the value added from the project, and make a recommendation to accept or reject the project	
		6. Carry out the microwave network analysis.		6. To describe and illustrate the important elements in project finance Using financial calculator and Excel in a variety of problems.	
		7. Choose a suitable microwave measurement instruments and carry out therequired measurements			

	Introduction to Internet of Things	Biomedical Signal Processing
B.Tech-ETC PART-II	By completion of the Course the students will be able :	By completion of the Course the students will be able to :
	1. Describe what IoT is and how it works today	1. The student will be able to model a biomedical system.
	2. Recognise the factors that contributed to the emergence of IoT	2. The student will be able to understand various methods of acquiring bio signals.
	3. Design and program IoT devices	3. The student will be able to understand various sources of bio signal distortions and its remedial techniques.
	4. Use real IoT protocols for communication	4. The students will be able to analyze ECG and EEG signal with characteristic feature points.
	5. Secure the elements of an IoT device	5. The student will have a basic understanding of diagnosing bio-signals and classifying them.
	6. Design an IoT device to work with a Cloud Computing infrastructure.	
	7. Transfer IoT data to the cloud and in between cloud providers	
	8. Define the infrastructure for supporting IoT deployments	

Department of Electronics and Telecommunication Eng

Course outcomes

	Engineering Mathematics -III	**Analog Circuits**	**Electronic Devices & Circuits**
	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :
S.Y.-ETC PART-I	1. Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.	1. Understand the characteristics of IC and Op-Amp and identify the internal structure.	1. Comply and verify parameters after exciting devices by any stated method.
	2. Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing.	2. Understand and identify various manufacturing techniques.	2. Implement circuit and test the performance.
	3. Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.	3. Derive and determine various performances based parameters and their significance for Op-Amp.	3. Analyze small signal model of FET and MOSFET.
	4. Perform vector differentiation and integration, analyze the vector fields and apply to Electromagnetic fields.	4. Comply and verify parameters after exciting IC by any stated method.	4. Explain behavior of FET at low frequency.

5. Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.	5. Analyze and identify the closed loop stability considerations and I/O limitations.	5. Design an adjustable voltage regulator circuits.
	6. Analyze and identify linear and nonlinear applications of Op-Amp.	
	7. Understand and verify results (levels of V & I) with hardware implementation.	
	8. Implement hardwired circuit to test performance and application for what it is being designed.	
	9. Understand and apply the functionalities of PLL.	

Electrical Machines and Instruments	**Analog Communication Engineering**	**Microprocessor**
By completion of the Course the students will be able to :	**By completion of the Course the students will be able to :**	**By completion of the Course the students will be able to :**

	1. The ability to formulate and then analyze the working of any electrical machine using mathematical model under loaded and unloaded conditions.	1. Understand and identify the fundamental concepts and various components of analog communication systems. 2. Understand the concepts of modulation and demodulation techniques. 3. Design circuits to generate modulated and demodulated wave.	1. Learner gains ability to apply knowledge of engineering in designing different case studies.
	2. The skill to analyze the response of any electrical machine.	2. Understand the concepts of modulation and demodulation techniques.	2. Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications.
	3. The ability to troubleshoot the operation of an electrical machine.	3. Design circuits to generate modulated and demodulated wave.	3. Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles.
S.Y.-ETC PART-II	4. The ability to select a suitable measuring instrument for a given application.	4. Equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance.	4. Students can identify and formulate control and monitoring systems using microprocessors.
	5. The ability to estimate and correct deviations in measurements due to the influence of the instrument and due to the accuracy of the instrument.	5. Understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase).	5. Students will design cost effective real time system to serve engineering solution for Global, social and economic context.

	6. Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.	6. This course understanding will enforce students to acquire knowledge of recent trends like superscalar and pipelining and thus finds recognition of continuous updation.
	7. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.	7. Learn use of hardware and software tools.
		8. Develop interfacing to real world devices.

	Electromagnetic Field Theory	**Control System Engineering**	**Computer Architecture**
	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :	By completion of the Course the students will be able :
	1. Understand characteristics and wave propagation on high frequency transmission lines	1. Understand the modeling of linear-time-invariant systems using transfer function and state-space representations.	1. learn how computers work
	2. Carryout impedance transformation on TL	2. Understand the concept of stability and its assessment for linear-time invariant systems.	2. know basic principles of computer‟s working
	3. Use sections of transmission line sections for realizing circuit elements	3. Design simple feedback controllers	3. analyze the performance of computers
	4. Characterize uniform plane wave		4. know how computers are designed and built
T.Y. ETC PART-I	5. Calculate reflection and transmission of waves at media interface		5. Understand issues affecting modern processors (caches, pipelines etc.).

6. Analyze wave propagation on metallic waveguides in modal form		
7. Understand principle of radiation and radiation characteristics of an antenna		

	Antennas and Wave Propagation	**Computer Network & Cloud Computing**	**Digital Image Processing**
	By completion of the Course the students will be able :	By completion of the Course the students will be able :	By completion of the Course the students will be able :
	1. Formulate the wave equation and solve it for uniform plane wave.	1. To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.	1. Review the fundamental concepts of digital image processing system.
	2. Analyze the given wire antenna and its radiation characteristics.	2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.	2. Analyze images in the frequency domain using various transforms.
	3. Identify the suitable antenna for a given communication system.	3. To be familiar with wireless networking concepts.	3. Categories various compression techniques.
T.Y. ETC PART II		4. To be familiar with contemporary issues in networking technologies.	4. Interpret image segmentation and representation techniques.

PART-II		5. To be familiar with network tools and network programming.	
		6. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component.	
		7. For a given problem related TCP/IP protocol developed the network programming.	
		8. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.	

	Digital Communication	**Microwave Theory and Techniques**	**Embedded System Design**
	By completion of the Course the students will be able to :	By completion of the Course the students will be able :	By completion of the Course the students will be able :
	1. Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.	1. Formulate the wave equation in wave guide for analysis.	1. Suggest design approach using advanced controllers to real-life situations.
	2. Perform the time and frequency domain analysis of the signals in a digital communication system.	2. Identify the use of microwave components and devices in microwave applications.	2. Design interfacing of the systems with other data handling / processing systems.

B.Tech.(ETC) Part I	3. Select the blocks in a design of digital	3. Understand the working principles of	3. Appreciate engineering constraints like
	4. Analyze Performance of spread spectrum communication system	4. Understand the working principles of all the solid state devices.	4. Get to know the hardware – software co design issues and testing methodology for embedded system.
		5. Choose a suitable microwave tube and solid state device for a particular application.	
		6. Carry out the microwave network analysis.	
		7. Choose a suitable microwave measurement instruments and carry out therequired measurements	

	Introduction to Internet of Things	**Biomedical Signal Processing**
	By completion of the Course the students will be able :	By completion of the Course the students will be able to :
	1. Describe what IoT is and how it works today	1. The student will be able to model a biomedical system.
	2. Recognise the factors that contributed to the emergence of IoT	2. The student will be able to understand various methods of acquiring bio signals.

B.Tech-ETC PART-II	3. Design and program IoT devices	3. The student will be able to understand various sources of bio signal distortions and its remedial techniques.
	4. Use real IoT protocols for communication	4. The students will be able to analyze ECG and EEG signal with characteristic feature points.
	5. Secure the elements of an IoT device	5. The student will have a basic understanding of diagnosing bio-signals and classifying them.
	6. Design an IoT device to work with a Cloud Computing infrastructure.	
	7. Transfer IoT data to the cloud and in between cloud providers	
	8. Define the infrastructure for supporting IoT deployments	

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Network Analysis	**Digital Logic Design**	Basic Human Rights
By completion of the Course the students will be able to :	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :
1. Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyze the same.	1. Use the basic logic gates and various reduction techniques of digital logic circuit in detail.	1. Simply put, human rights education is all learning that develops the knowledge, skills, and values of human rights.
2. Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters as well as digital filters and even extend this to advance adaptive filters.	2. Design combinational and sequential circuits.	2. Strengthen the respect for human rights and fundamental freedoms.
3. Identify issues related to transmission of signals, analyze different RLC networks.	3. Design and implement hardware circuit to test performance and application.	3. Enable all persons to participate effectively in a free society.
4. Find technology recognition for the benefit of the society.	4. Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.	4. Learn about human rights principles, such as the universality, indivisibility, and interdependence of human rights.

		5. Learn about regional, national, state, and local law that reinforces international human rights law.
		6. Learn and know about and being able to use global, regional, national, and local human rights instruments and mechanisms for the protection of human rights.

Signals and Systems	Product Design Engineering	Numerical Methods and Computer Programming
By completion of the Course the students will be able to :	**By completion of the Course the students will be able to :**	**By completion of the Course the students will be able to :**

1. Understand mathematical description and representation of continuous and discrete time signals and systems.	1. Create simple mechanical or other designs	1. Able to solve algebraic and transcendental equations by using numerical techniques and will be able to compare different numerical techniques used for this purpose and also will be able to choose a proper one as per the requirement of the problem.
2. Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.	2. Create design documents for knowledge sharing	2. Able to solve a system of linear equations with any number of variables using different direct and iterative numerical techniques.
3. Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.	3. Manage own work to meet design requirements	3. Understand the concept of interpolation, finite difference operators and their relations, and can apply different interpolation techniques on equi-spaced or non equi-spaced data values
4. Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s-domain.	4. Work effectively with colleagues.	4. Prepare them to write computer programs for the numerical computational techniques.
5. Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event.		5. Understand application of the NMCP course in many engineering core subjects like signal processing, digital communication, numerical techniques in electromagnetics etc.

		6. Understand procedure-oriented and object oriented programming concepts.
		7. Capable of writing C and C++ programs efficiently

Digital Signal Processing	**Microcontroller and its Applications**	**Probability Theory and Random Processes**
By completion of the Course the students will be able to :	By completion of the Course the students will be able to :	By completion of the Course the students will be able to :
1. Understand use of different transforms and analyze the discrete time signals and systems.	1. Learner gains ability to apply knowledge of engineering in designing different case studies.	1. Understand representation of random signals
2. Realize the use of LTI filters for filtering different real world signals.	2. Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications.	2. Investigate characteristics of random processes
3. Capable of calibrating and resolving different frequencies existing in any signal.	3. Graduates will be able to design real time controllers using microcontroller based system	3. Make use of theorems related to random signals
4. Design and implement multistage sampling rate converter.	4. Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles.	4. To understand propagation of random signals in LTI systems.
5. Design of different types of digital filters for various applications.	5. Students can identify and formulate control and monitoring systems using microcontrollers.	

	6. Students will design cost effective real time system to serve engineering solution for Global, social and economic context.	
	7. Learners get acquainted with modern tools like Programmers, Debuggers, cross compilers and current IDE i.e. integrated development environment tools.	
	8. Learn importance of microcontroller in designing embedded application.	
	9. Learn use of hardware and software tools.	
	10. Develop interfacing to real world devices.	

Power Electronics	**Digital System Design**	**Employability & Skill Development**
By completion of the Course the students will be able :	By completion of the Course the students will be able :	By completion of the Course the students will be able :
1. Build and test circuits using power devices such as SCR	1. Design and analyze combinational logic circuits	1. Have skills and preparedness for aptitude tests.
2. Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters,	2. Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder	2. Be equipped with essential communication skills (writing, verbal and non-verbal)
3. Learn how to analyze these inverters and some basic applications.	3. Design & analyze synchronous sequential logic circuits	3. Master the presentation skill and be ready for facing interviews.
4. Design SMPS.	4. Use HDL & appropriate EDA tools for digital logic design and simulation	4. Build team and lead it for problem solving.

Consumer Electronics	Financial Management
By completion of the Course the students will be able to :	By completion of the Course the students will be able :
1. List technical specification of electronics Audio system (microphone and speaker)	1. The students would be able to understand and define basic terminology used in finance and accounts
2. Trouble shoots consumer electronics products like TV, washing machine and AC.	2. The students would be able to prepare& appraise Financial Statements and evaluate a company in the light of different measurement systems.

3. Identify and explain working of various	3. The students would be able to analyze the risk
4. Adjust various controls of color TV receiver and troubleshoot it.	4. Estimate cash flows from a project, including operating, net working capital, and capital spending.
5. Use various functions of Cam coder and shoot a video and take snapshots and save them in appropriate format	5. To estimate the required return on projects of differing risk ,to estimate the cash flows from an investment project, calculate the appropriate discount rate, determine the value added from the project, and make a recommendation to accept or reject the project
	6. To describe and illustrate the important elements in project finance Using financial calculator and Excel in a variety of problems.

Shri Tuljabhavani College Of Engg. Tuljapur

Computer Science And Engineering Department

Course outcomes		
• **Second Year CSE**		
• **Course no.**	• **Course code**	• **Course name**
• C301	• BTBS301	• Engineering Mathematics – III
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Find Laplace Transforms of elementary functions by applying suitable property and/or suitable method.	
• **2**	• Find Inverse Laplace Transforms of elementary functions by applying suitable property and/or suitable method.	
• **3**	• Write the Fourier Integral of elementary functions by applying suitable formula also problems related to Fourier transforms to domain specific problems.	
• **4**	• Formulate Partial Differential Equations by eliminating arbitrary constants and functions from system arises in respective domain, also solve them using appropriate technique.	
• **5**	• Check the Analyticity of given function and use its other properties as and when required, construct analytic function using suitable technique. Perform contour integration of complex functions by using suitable technique.	
• **Course no.**	• **Course code**	• **Course name**
• C302	• BTCOC302	• Discrete Mathematics
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• To develop understanding of Logic Sets and Functions.	
• **2**	To use mathematical reasoning techniques including induction and recursion	
• **3**	To understand and apply counting techniques to the representation and Characterization of relational concepts.	
• **4**	To develop an understanding of how graph and tree concepts are used to solve problems arising in the computer science	

• **5**	To communicate the solutions of technical problems to other professionals and to develop improved collaborative skills

• **Course no.**	• **Course code**	• **Course name**
• C303	• BTCOC303	• Data Structures

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Students are able to understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
• **2**	• Students are able to understand basic data structures such as arrays, linked lists, stacks and queues.
• **3**	• Students are able to describe the hash function and concepts of collision and its resolution methods
• **4**	• Students are able to solve problem involving graphs, trees and heaps
• **5**	• Students are able to apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

• **Course no.**	• **Course code**	• **Course name**
• C304	• BTCOC304	• Computer Architecture & Organization

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• To learn how computer works
• **2**	• To learn the basic instruction set
• **3**	• Analyze the performance of Computer
• **4**	• Understand the designing of computer
• **5**	• Understand the design of control unit

• **Course no.**	• **Course code**	• **Course name**
• C305	• BTCOC305	• Elective –I (b) Object Oriented Programming in Java

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• To Explain Features of object-oriented Programming
• **2**	• To learn control flow statements in Java.
• **3**	• To learn how to use array in Java. how to pass arrays to method in java
• **4**	• To learn how to extend Java classes with inheritance and dynamic binding.

• 5	• To learn how to use exception handling in Java applications, able to explain what is JavaScript and able to write client side scripting.

• Course no.	• Course code	• Course name
• C306	• BTCOL306	• Data Structures Lab & Object Oriented Programming Lab

• COs	• After the successful completion of this course student will be able to:
• 1	• To Explain Features of object-oriented Programming
• 2	• To learn control flow statements in Java.
• 3	• To learn how to use array in Java. how to pass arrays to method in java
• 4	• To learn how to extend Java classes with inheritance and dynamic binding.
• 5	• To learn how to use exception handling in Java applications, able to explain what is JavaScript and able to write client side scripting .

• Course no.	• Course code	• Course name
• C307	• BTCOS307	• Seminar – I

• COs	• After the successful completion of this course student will be able to:
• 1	• TO Demonstrate a sound technical knowledge of their selected seminar topic
• 2	• To Undertake problem identification,
• 3	• TO formulate and solution for a Problem
• 4	• To Design engineering solutions to complex problems utilizing a systems approach
.	• To Provide Effective presentation and improve soft skills

• Course no.	• Course code	• Course name
• C308	• BTES211P	• Field Training / Internship / Industrial Training Evaluation

• COs	• After the successful completion of this course student will be able to:
• 1	• Integrate theory and practice.
• 2	• Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.

• **3**	• Determine the challenges and potential for his / her internship organization in particular and the sector in general.
• **4**	• Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.

• **Second Year-II**		
• **Course no.**	• **Course code**	• **Course name**
• C401	• BTCOC401	• Design & Analysis of Algorithms
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Analyze the asymptotic performance of algorithms	
• **2**	• Familiar with major algorithms	
• **3**	• Apply important algorithmic design paradigms and methods of analysis	
• **4**	• Synthesize efficient algorithms in engineering design situations	
• **Course no.**	• **Course code**	• **Course name**
• C402	• BTCOC402	• Operating Systems
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Identify the role of the operating system as a high-level interface to the hardware	
• **2**	• Understand the Memory Management Strategies for Memory management	
• **3**	• Illustrate the low-level implementation of CPU dispatch and scheduling	
• **4**	• Apply appropriate knowledge for handling Deadlock, Process Synchronization	
• **5**	• Outline the need to handle I/O device with memory management strategies	
• **Course no.**	• **Course code**	• **Course name**
• C403	• BTHM403	• Basic Human Rights
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Understand the history of human rights.	
• **2**	• Learn to respect others caste, religion, region and culture and Be aware of their rights as Indian citizen	

• **3**	• Realize the philosophical and cultural basis and historical perspectives of human rights.
• **4**	• Make them aware of their responsibilities towards the nation.

• **Course no.**	• **Course code**	• **Course name**
• C404	• BTBS404	• Probability Theory and Random Processes

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• To understand the different approach of probability and apply the laws of addition and multiplication theorem with the help of properties of probability and will try to solve the examples based on Inverse probability.
• **2**	• To distinguish between discrete and continuous random variables. Be able to compute & interpret the expected value, variance & S.D. for discrete data.
• **3**	• To compute & interpret the Karl person correlation coefficient & test for significance. Compute & interpret the spearman's rank correlation coefficient.
• **4**	• To Solve examples on regression lines, angle between them & coefficient of regression with the help of theorems and examples.
• **5**	• To understand estimation and sample estimation. And try to learn Hypothesis's

• **Course no.**	• **Course code**	• **Course name**
• C405	• BTES405	• Digital Logic Design & Microprocessors

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
• **2**	• Design combinational circuits.
• **3**	• Design Sequential circuits.
• **4**	• Understand the architecture of 8086
• **5**	• Understand 8086 instruction set and programming's

• **Course no.**	• **Course code**	• **Course name**
• C406	• BTCOL406	• Operating Systems & Python Programming Lab

• **COs**	• After the successful completion of this course student will be able to:

• 1	• Identify the role of the operating system as a high-level interface to the hardware

• 2	• Understand the Memory Management Strategies for Memory management
• 3	• Illustrate the low-level implementation of CPU dispatch and scheduling
• 4	• Apply appropriate knowledge for handling Deadlock, Process Synchronization
• 5	• Outline the need to handle I/O device with memory management strategies
• 6	• PY: To learn installation, fundamentals, features and future of Python programming.
• 7	• To acquaint with data types, input output statements, decision making, looping and functions in Python.
• 8	• PY: To acquaint with the use and benefits of exception handling and file handling in Python.
• 9	• PY: To learn features of Object Oriented Programming using Python.
• 10	• PY: To learn Programming with database using Python.

• Course no.	• Course code	• Course name
• C407	• BTCOS407	• Seminar – II

• COs	• After the successful completion of this course student will be able to:
• 1	To Establish motivation for any topic of interest and develop a thought process for Technical presentation.
• 2	• To Organize a detailed literature survey and build a document with respect to technical publications.
• 3	• To perform Analysis and comprehension of available data
• 4	• TO Make use of new and recent technology (e.g. Latex) for creating technical reports
• 5	• Effective presentation and improve soft skill

• Course no.	• Course code	• Course name
• C408	• BTCOF408	• Field Training / Internship / Industrial Training Evaluation

• COs	• After the successful completion of this course student will be able to:
• 1	• Integrate theory and practice.
• 2	• Apply various soft skills such as time management, positive attitude

	and communication skills during performance of the
	tasks assigned in internship organization.
● **3**	● Determine the challenges and potential for his / her internship organization in particular and the sector in general.
● **4**	● Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.
● **5**	.

● **Third Year-CSE- I**		
● **Course no.**	● **Course code**	● **Course name**
● C501	● BTCOC501	● Database System

● **COs**	● After the successful completion of this course student will be able to:
● **1**	Analyze and design Database Management system using E-R diagram and convert entity relationship diagrams into RDBMS
● **2**	● Implement database queries using relational algebra and calculus
● **3**	● Implement database queries using structured query language
● **4**	● Normalize the database design using normalization process and its various forms
● **5**	Apply the transaction management and concurrency control concepts in real time examples

● **Course no.**	● **Course code**	● **Course name**
● C502	● BTCOC502	● Theory of Computations

● **COs**	● After the successful completion of this course student will be able to:
● **1**	● Students will be able to build regular expressions for given regular language.
● **2**	● Students will be able to illustrate different types of automata
● **3**	● Students will be able to explain regular and non-regular languages.
● **4**	● Students will be able to solve context free grammar.
● **5**	● Students will be able to introduce different types of Pushdown automata and Turing machine's

● **Course no.**	● **Course code**	● **Course name**

• C503	• BTCOC503	• Machine Learning

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Regular language.
• **2**	• Students will be able to Classify supervised, Unsupervised & reinforcement learning problem
• **3**	• Students will be able to Design solution to regression problems.
• **4**	• Students will be able to Solve clustering problems & evaluate the results.

• **Course no.**	• **Course code**	• **Course name**
• C504	• BTCOE504	• Elective –III (a) Introduction to research

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Understand the different steps involved in Research Process
• **2**	• Conduct literature survey for specific domain in Research
• **3**	• Decide the appropriate Modeling Skills, Experiment Skills and Data Analysis methodology used for carrying out Research.
• **4**	• Conduct Technical writing, Report writing on specific domain in research

• **Course no.**	• **Course code**	• **Course name**
• C505	• BTHM505	• Elective-III (b)Business communication

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Apply business communication strategies and principles to prepare effective communication for domestic and international business
• **2**	• Identify ethical, legal, cultural, and global issues affecting business communication.
• **3**	• Participate in team activities that lead to the development of collaborative work skills.
• **4**	• Select appropriate organizational formats and channels used in developing and presenting business messages.
• **5**	• Express an effective oral business presentation

• **Course no.**	• **Course code**	• **Course name**
• C506	• BTCOC506	• competitive

		programming -I
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Analyze (decode) the problem statement given	
• **2**	• Write an algorithm for given problem statement	
• **3**	• Explain the flowchart for algorithm written for problem statement	
• **4**	• List and explain the data structures required to solve the problem statement	
• **5**	• Implement program for algorithm for given problem statement	
• **6**	• Differentiate between the programming languages and select proper one for given problem statement	
• **7**	• Use functionalities to solve problem statement	
• **Course no.**	• **Course code**	• **Course name**
• C507	• BTCOL507	• Database System Laboratory
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	Analyze and design Database Management system using E-R diagram and convert entity relationship diagrams into RDBMS	
• **2**	• Implement database queries using relational algebra and calculus	
• **3**	• Implement database queries using structured query language	
• **4**	• Normalize the database design using normalization process and its various forms	
• **5**	• Apply the transaction management and concurrency control concepts in real time examples	
• **Course no.**	• **Course code**	• **Course name**
• C508	• BTCOL508	• Machine Learning Laboratory
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Students will be able to design solution to classification problems	
• **2**	• Students will be able to Classify supervised, Unsupervised & reinforcement learning problem	
• **3**	• Students will be able to Design solution to regression problems.	

• **4**	• Students will be able to Solve clustering problems & evaluate the results.	
• **Course no.**	• **Course code**	• **Course name**
• C509	• BTCOS509	• Seminar
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	To train the students in preparing and presenting technical topics	
• **2**	To clarify, deepen the understanding in the subject, and also increase Confidence and presentation skills.	
• **3**	• To identifying topics of interest related to the program of study and make presentation	
• **4**	• To Build Confidence while performing seminar work	
• **5**	• Effective presentation and improve soft skills	
• **Course no.**	• **Course code**	• **Course name**
• C510	• BTCOF411	• Field training internship industrial training evaluation
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Integrate theory and practice.	
• **2**	• Apply various soft skills such as time managem ent, positive attitude and communication skills during performance of the tasks assigned in internship organization.	
• **3**	• Determine the challenges and potential for his / her internship organization in particular and the sector in general.	
• **4**	• Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.	
• **Third Year- CSE- II**		
• **Course no.**	• **Course code**	• **Course name**
• C601	• BTCOC601	• Compiler Design
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Acquire knowledge of different phases and passes of the compiler. . Students will also be able to design different types	

	of compiler tools to meet the requirements of the realistic constraints of compilers
• **2**	• Understand the parser and its types i.e. Top-Down and Bottom-up parsers and construction of LL, SLR, CLR, and LALR parsing table**.**
• **3**	• Describe intermediate code representations using syntax trees and DAG has as well as use this knowledge to generate intermediate code in the form of three address code representations.
• **4**	• Understand the target machine's run time environment, its instruction set for code generation and techniques used for code optimization
• **5**	• Summarize various optimization techniques used for dataflow analysis.

• **Course no.**	• **Course code**	• **Course name**
• C602	• BTCOC602	• Computer Networks

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies
• **2**	• Demonstrate design issues, flow control and error control Illustrate Client-Server architectures and prototypes by the means of correct standards and technology. Local area networks and wide area networks.
• **3**	• Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols
• **4**	• Demonstrate different routing and switching algorithms
• **5**	• Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community.

• **Course no.**	• **Course code**	• **Course name**
• C603	• BTCOE603	• Elective-V(b) Artificial Intelligence

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• To understand concepts of artificial intelligence
• **2**	• To explain intelligent Agent and types of Environment?
• **3**	• To elaborate what is constraint , types of constraints
• **4**	• To explore Different types of algorithms like BFS, DFS, IDDFS, A*, RBFS etc.

• **Course no.**		• **Course code**	• **Course name**
• C604		• BTCOE 604	• Internet of Things
• **COs**	• After the successful completion of this course student will be able to:		
• **1**	• Students can describe the IOT network Architecture		
• **2**	• Compare smart objects and associated technologies for deployment in the network		
• **3**	• Describe IP layer and application protocols used in IOT		
• **4**	• Elaborate Data and Analytics for IOT		
• **5**	• Build IOT application with Arduino & Raspberry pi		
• **Course no.**		• **Course code**	• **Course name**
• C605		• BTCOE605	• Elective-VII (c)Consumer Behavior
• **COs**	• After the successful completion of this course student will be able to:		
• **1**	• Apply business communication strategies and principles to prepare effective communication for domestic and international business		
• **2**	• Identify ethical, legal, cultural, and global issues affecting business communication.		
• **3**	• Participate in team activities that lead to the development of collaborative work skills		
• **4**	• Select appropriate organizational formats and channels used in developing and presenting business messages.		
• **5**	• Express an effective oral business presentation		
• **Course no.**		• **Course code**	• **Course name**
• C606		• BTCOC606	• Competitive Programming II
• **COs**	• After the successful completion of this course student will be able to:		
• **1**	• Analyze (decode) the problem statement given		
• **2**	• Write an algorithm for given problem statement		
• **3**	• Explain the flowchart for algorithm written for problem statement		
• **4**	• List and explain the data structures required to solve the problem statement		
• **5**	• Implement program for algorithm for given problem statement		

• **6**	• Differentiate between the programming languages and select proper one for given problem statement	
• **7**	• Use functionalities to solve problem statement	
• **Course no.**	• **Course code**	• **Course name**
• C607	• BTCOL607	• Internet of things Laboratory
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Build IOT application with Ardunio	
• **2**	• Build IOT application with Rasberrypi	
• **3**	• Implement the connectivity of Ardunio Kit	
• **4**	• Implement the connectivity of Rasberrypi Kit	
• **5**	• Build IOT application by using Ardunio & Rasberrypi with sensors	
• **Course no.**	• **Course code**	• **Course name**
• C608	• BTCOL608	• Computer Networks Laboratory
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Working knowledge of datagram and internet socket programming	
• **2**	• Design and test simple programs to implement networking concepts using Java.	
• **3**	• Design simple data transmission using networking concepts and implement.	
• **4**	• Demonstrate different routing and switching algorithms	
• **5**	• Compare and analyze different existing protocols.	
• **Course no.**	• **Course code**	• **Course name**
• C609	• BTCOF609	• Field Training / Internship/ Industrial Training
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Integrate theory and practice.	
• **2**	• Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.	
• **3**	• Determine the challenges and potential for his / her internship organization in particular and the sector in general.	

• **4**	• Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.

• **Final Year- CSE-I**		
• **Course no.**	• **Course code**	• **Course name**
• C701	• BTCOC701	• Software Engineering

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• To understand and Know the Software Engineering Framework, Practice & Process Models.
• **2**	Knowing the key practices in extreme programming and how these relate to the general Principles of agile methods
• **3**	• Understand, analyze, and design using UML of real word problem Statement.
• **4**	• Apply and Implement real word problem Statement using UML design techniques.
• **5**	To understand Software testing, Development testing, Test- driven development, Release testing, User testing.
• **6**	• Understand and Analyze the Dependability properties, Availability and reliability, Safety Security

• **Course no.**	• **Course code**	• **Course name**
• C702	• BTCOE702	• Elective - VIII (B) Distributed System

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Identify the core concepts of distributed systems (level 1)
• **2**	• Distinguish distributed computing paradigm from other computing paradigms (level 2)
• **3**	• Illustrate the mechanisms of Inter process communication in distributed system (level 3)
• **4**	• Apply appropriate distributed system principles in ensuring transparency, consistency and fault-tolerance in distributed file system and avoid issues like, saturation, Deadlock (level 3)
• **5**	• Outline the need for mutual exclusion and election algorithms in distributed systems (level 4)

• Course no.	• Course code	• Course name
• C703	• BTCOE703	• Elective - IX (A) Cloud Computing

• COs	• After the successful completion of this course student will be able to:
• 1	"Understand Cloud Computing, reference models, Virtualization along with the licensing of software's "
• 2	• design Cloud Computing Architecture, Types of Clouds and Challenges
• 3	• know how to setup cloud enterprise with example of storage, database as a service
• 4	• Learn and Apply Aneka Cloud Platforms, SDK, Management Tools
• 5	"Implement and use the various services of cloud in different sectors like healthcare, finance, Business and consumer "
• 6	• Create cloud computing environment for sample organization using different tools
• 7	• Apply Microsoft Azure and Implement cloud based application

• Course no.	• Course code	• Course name
• C704	• BTCOE704	• Open Elective - X (A) Block chain Technology

• COs	• After the successful completion of this course student will be able to:
• 1	• Understand block chain technology.
• 2	• Describe the working of bit coin crypto currency.
• 3	• Build and deploy block chain application for on premise and cloud based architecture.
• 4	• Integrate ideas from various domains and implement them using block chain technology in different perspectives.
• 5	• Design smart contract using Ethereal.
• 6	• Design smart contract using Hyperactive ledger Fabric frameworks.
• 7	• Understand The life of a Bit coin Miner.

• Course no.	• Course code	• Course name

• C705	• BTCOL705	• Full Stack Development (LAMP / MEAN)
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Develop skills necessary to design, develop and style a web based user interfaces	
• **2**	• Develop skills required to create lightweight browser based web applications using client side scripting.	
• **3**	• Develop skill to use different JavaScript frameworks for developing responsive websites	
• **4**	• Develop skills necessary to develop efficient, scalable, web based applications	
• **5**	• Develop ability to identify use cases for applying client and server side scripting web technologies	
• **Course no.**	• **Course code**	• **Course name**
• C706	• BTCOL706	• System Administration
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Implement the successful installation of different Linux platforms like Ubuntu, centos	
• **2**	• Build the Ubuntu System with SSH Server installed to enable or disable root login	
• **3**	• Implement the successful installation of Telnet Server on Cent OS	
• **4**	• Implement the FTP Server installation on CentOS or Ubuntu	
• **5**	• Complete the upload and download of files using FTP server	
• **6**	• Complete the installation of SAMBA and HTTP Server on Ubuntu	
• **7**	• Complete the installation of Proxy Server	
• **Course no.**	• **Course code**	• **Course name**
• C707	• BTCOL707	• Elective – VIII Lab
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Identify the core concepts of distributed systems (level 1)	
• **2**	• Distinguish distributed computing paradigm from other computing paradigms (level 2)	
• **3**	• Illustrate the mechanisms of Inter process communication in distributed system (level 3)	

• **4**	• Apply appropriate distributed system principles in ensuring transparency, consistency and fault-tolerance in distributed file system and avoid issues like, saturation, Deadlock (level 3)
• **5**	• Outline the need for mutual exclusion and election algorithms in distributed systems (level 4)

• **Course no.**	• **Course code**	• **Course name**
• C708	• BTCOL708	• Elective – IX Lab

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Understand Cloud Computing, reference models, Virtualization along with the licensing of software's
• **2**	• design Cloud Computing Architecture, Types of Clouds and Challenges
• **3**	• design Cloud Computing Architecture, Types of Clouds and Challenges
• **4**	• design Cloud Computing Architecture, Types of Clouds and Challenges
• **5**	• Implement and use the various services of cloud in different sectors like healthcare, finance, Business and consumer
• **6**	• Create cloud computing environment for sample organization using different tools
• **7**	• Apply Microsoft Azure and Implement cloud based application

• **Course no.**	• **Course code**	• **Course name**
• C709	• BTCOP709	• Project phase - I

• **COs**	• After the successful completion of this course student will be able to:
• **1**	• Identify and formulate Engineering problem addressing needs of Industry & Society.
• **2**	Conduct investigations of the Engineering problem formulated by using Engineering Sciences.
• **3**	Design and develop solution(s) for Engineering problem with due consideration to public health, safety, culture, society, environment and sustainability.
• **4**	Create, select and apply modern tools for investigating, designing and developing

	Solution (s) to engineering problem.
● **5**	● Work as individual and in team for communicating and managing the project work ● And its fiancés.
● **6**	Apply professional ethics while identifying the problem, investigating the problem, designing a solution to the problem, working as an individual or team for communicating and managing the project work and its finances.
● **7**	● Develop ability for independent & lifelong learning.

● **Course no.**	● **Course code**	● **Course name**
● C710	● BTCOF609	● Field Training / Internship / Industrial Training

● **COs**	● After the successful completion of this course student will be able to:
● **1**	● Integrate theory and practice.
● **2**	● Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
● **3**	● Determine the challenges and future potential for his / her internship organization in particular and the sector in general.
● **4**	● Construct the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.

● **Final Year-CSE- II**

● **Course no.**	● **Course code**	● **Course name**
● C801	● **BTCOE801**	● **Elective - XI # (A) Deep Learning**

● **COs**	● After the successful completion of this course student will be able to:
● **1**	● compare modeling aspects of various neural network architectures
● **2**	● implement simple neural network algorithms
● **3**	● apply and evaluate deep learning on real data sets
● **4**	● Impalement Linear regression, linear classifiers
● **5**	● compare modeling aspects of various neural network architectures

● **Course no.**	● **Course code**	● **Course name**

• C802	• BTCOE802	• Open Elective – XII
		• (A) Introduction to Industry 4.0 and Industrial • Internet of Things
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Understand Industry 4.0.	
• **2**	• Describe the working of Cyber security in Industry 4.0.	
• **3**	• Describe the Industrial Processes.	
• **4**	• Understand Industrial IOT- Layers.	
• **5**	• Describe the Security and Fog Computing in Industrial IOT.	
• **6**	• Design Industrial IOT- Application Domains: Healthcare.	
• **7**	• Design Industrial IOT- Application Domains: pharmaceutical industry.	
• **Course no.**	• **Course code**	• **Course name**
• C803	• BTCOE803	• Project phase - II (In-house) $ / Internship and project in the Industry
• **COs**	• After the successful completion of this course student will be able to:	
• **1**	• Apply concepts of project management.	
• **2**	• Develop a project model.	
• **3**	• Understand project modeling andworking.	
• **4**	• Analyze post project operating stages.	

SHRI TULJABHAVANI TEMPLE TRUST
SHRI TULJABHAVANI COLLEGE OF ENGINEERING, TULJAPUR

FIRST YEAR OF B. TECH. -2022-23

COURSE OUTCOMES

	1. Engineering Mathematics-I	2. Communication Skills	3. Engineering Physics	4. Engineering Graphics	5. Basic Civil Engineering	6 Energy and Environment Engineering
	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :
FY - B. TECH Part - I	Apply the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problem	Student can frame grammatically correct sentences for day to day communication	The student will be able to understand Engineering problems based on the principle of Oscillation, Ultrasonics, Optics, Laser, Fibre optics, Nuclear physics, Quantum mechanics	1. Enhancing imagination, visualization, presentation and interpretation skills.	Describe the role of civil engineer in the development of the society and explain relationship of civil engineering with other branches of engineering and technology.	Identify conventional ,non conventional energy sources.
	Demonstrate the concept partial derivatives and their applications to Maxima/ Minima , series expansion of multi valued functions.	Student can use appropriate words in oral and written communication.	The student will be able to understand Fundamental of Electrodynamics, Semiconductor, Dielectric, Magnetic and Superconducting materials which forms the base of many modern devices and technologies.	2. Introduce the students to the universal language and tool of communication of engineers.	.Discuss types of buildings and select materials of construction.	Know and discuss power consuming and power developing devices for effective utilization and power consumption

	Compute Jacobian of functions of several variables and their applications to engineering problems	Student can demonstrate effective speaking skills in various situations		3. Make them thorough in understanding and using the various concepts-elements and grammar of Engineering Graphics.	Explain the elements of water supply such as dam, canal and elements of transportation structures.	Identify various sources of air, water pollution and its effects
	Identify and sketch of curves in various coordinate system	.Student can comprehend and analyze a passage.			.Measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.	. Know and discuss noise, soil, thermal pollution and Identify solid, biomedical and hazardous waste
	Evaluate multiple integrals and their applications to area and volume	Student can draft letters, emails and write paragraphs with appropriate content and context.			Explain the advantages of advances in civil engineering like remote sensing techniques, GIS and GPS.	

	1. Engineering Mathematics - II	2. Engineering Mechanics	3 Engineering Chemistry	4. Basic Electrical & electronics Engineering	5. Computer Programming
	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :	At the end of the course, Students will be able to :
	Define the complex numbers and it's algebric properties. Use DMT solve various algebric equations, roots of complex number and expansion of trignometric functions and also define hyyperbolic functions.	Understand the basic principles of mechanics and apply them to real life problems.	Differentiate hard and soft water and use knowledge of water treatment for industrial and domestic purposes	Understand the basic concept of current , voltage , power, AC, DC and magnetic circuit.	able to understand transform flow chart and algorithms into a programming language

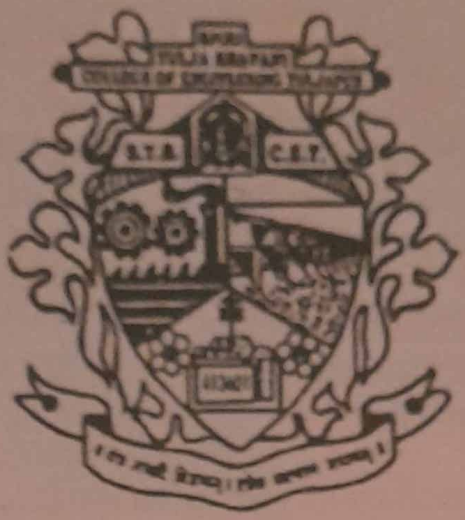
FY - B. TECH Part - II	Define ODE it's order and degree , Bernoulli"s equation. Examine various methods of solving ODE.	Draw free body diagrams.	Acquire the knowledge of phase equilibrium in one component and two component system.	Explain the principle, construction , working and applications of transformer, AC, DC machines.	To able to implement to write, compile and debug programs in C language.
	Understand concepts of homogenous and non - homogenous LDE and different methods to solving them. Analyze Cauchy"s homogeneous and Legendre"s linear equations, variation of parameter method	Formulate and the use of equilibrium equations.	Define metallurgy , explain the physical and chemical methods in metallurgy and understand the refining of metals	Gain the knowledge about fundamental of writing earthing and safety precautions.	To able to design programs involving decision structures, loops and functions
	Understand an Euler"s formulae, Conditions for Fourier series expansion - Dirichlet"s conditions and understand the Harmonic analysis.	Identify the principles and equations and use them to solving the problems in static and dynamics problems.	Acquire the knowledge of types of calorific value to determine the calorific value of fuels.	Analyze the structure of semiconductor and PN - junction diode.	Abile to design Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers
	Revise scalar and vector quantity and define vaious terms occurs in vector calculus.	Use the mathematical tools and standard procedures and as well as performing numerical calculations.		Understand various measuring instruments and transducer.	

	Engg.Graphics
F.E.	Students will be able to:
	1) Enhancing imagination, visualization, presentation and interpretation skill.
	2)Introduce the student to the universal language and tool of communication of engneers.
	3) Make them thorough in understanding and using the various concepts-elements and grammar of Engineering Graphics.

SHRI TULJABHAVANI TEMPLE TRUST'S

SHRI TULJABHAVANI COLLEGE OF ENGINEERING

TULJAPUR - 413610 DIST.DHARASHIV



ATTENDANCE
AND
ASSESSMENT RECORD
ACADEMIC YEAR 2023 -2024

SEMESTER : ~~FIRST~~ / SECOND ✓

CLASS : 1) SY 2) SY 3) _____ 4) _____

SUBJECT : 1) MP-I 2) SME 3) _____ 4) _____

NAME OF THE FACULTY : V. D. Dhanke

DEPARTMENT : Mechanical Engineering

Program Outcomes (PO's):

Graduates will be able to:

1. Apply knowledge of mathematics, science and engineering fundamentals to solve complex engineering problems.
2. Identify, formulate, review, research literature and analyze complex engineering problems.
3. Design solutions for complex engineering problems in view of societal and environmental conditions.
4. Conduct and investigate the complex engineering problems.
5. Use of modern tools for solving complex engineering problems.
6. Apply reasoning informed by society in view of health, safety and legal issues.
7. Understand impact of environmental context and demonstrate need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities.
9. Function effectively as individual and team leader.
10. Communicate effectively on complex engineering activities with engineering community and society at a large
11. Manage projects of multidisciplinary environments and demonstrate knowledge andunderstanding of management principles
12. Engage in independent and life-long learning in broadest context of technological change.