



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

Accredited by NAAC with "A" Grade & NBA for ASE, CE, CSE, ECE, EEE, ME & IT (Under Tier - I)
An ISO 21001:2018, 14001:2015 and 50001:2018 Certified Institution
Approved by AICTE, New Delhi and Permanently Affiliated to JNTUK, Kakinada
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FRESHMAN ENGINEERING DEPARTMENT

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Minutes of Board of Studies (BoS) Meeting held on 28-08-2026

The Board of Studies (BoS) Meeting of the Chemistry Module for R26 Regulations, UG I B.Tech., with reference to the syllabus prescribed by JNTUK, Kakinada, was held on **Friday, 28-08-2026, at 10.30 AM** through online mode using the Microsoft Teams platform.

The meeting was conducted under the chairmanship of **Dr. T. Satyanarayana**, Professor of Physics and Head, Freshman Engineering Department (FED).

The following members were present:

Sl.	Name of the Member, Designation & Affiliation	Role in BoS	Signature
1.	Dr. T. Satyanarayana Prof. of Physics & Head, FED & LBRCE hodfed@lbrce.ac.in ; drtssatyam@lbrce.ac.in	Chairman	
2.	Dr. D. Ramachandran, Professor, Department of Chemistry, Acharya Nagarjuna University, Guntur, Andhra Pradesh - 522510. dittakavirc@gmail.com Mobile: 9866965335 & 6300292763	University Nominee JNTUK Kakinada	
3.	Dr. V. Parvathi Prof. of Chemistry & LBRCE parvathi.sv14@lbrce.ac.in parvathi.sv.14@gmail.com Mobile: 9966010188	Module Coordinator	
4.	Dr. V. Parvathi Prof. of Chemistry & LBRCE parvathi.sv14@lbrce.ac.in parvathi.sv.14@gmail.com Mobile: 9966010188	Course Coordinator for Applied Chemistry for Emerging Technologies (Theory & Lab)	
5.	Dr. D. Mallikharjuna Rao Assoc. Prof. of Chemistry & LBRCE mallikarjunarao@lbrce.ac.in Mobile: 7075354931	Course Coordinator for Chemistry for Mechanical Systems (Theory & Lab) & Applied Chemistry for Aerospace Engineering (Theory & Lab)	
6.	Dr. S.L.V. Rajesh Babu Assoc. Prof. of Chemistry & LBRCE lvrbsyamala@lbrce.ac.in Mobile: 8551073039	Course Coordinator for Chemistry for Electrical Systems (Theory & Lab)	
7.	Dr. B. Rajasekhar Assoc. Prof. of Chemistry & LBRCE rsbreddi@gmail.com Mobile: 8277418409	Course Coordinator for Chemistry for Civil Engineers (Theory & Lab)	
8.	Dr. Y. Subbareddy Sr. Asst. Prof. of Chemistry & LBRCE ysrdpalc@gmail.com	Course Coordinator for Applied Chemistry (Theory & Lab)	

	ysr@lbrce.ac.in Mobile: 9177277520		
9.	Mr. S. Vijaya Dasaradha Asst. Prof. of Chemistry & LBRCE dasaradhasani@gmail.com Mobile: 9492526153	Member	
10.	Mrs. K. Sri Lakshmi Asst. Prof. of Chemistry & LBRCE srilakshmik930@gmail.com Mobile: 9885009080	Member	

Welcome Address

Dr. V. Parvathi, Chemistry Module Coordinator, welcomed the Chairman Dr. T. Satyanarayana, Professor, Head of Freshman Engineering Department, External BoS Member nominated by JNTUK, Dr. D. Ramachandran, Professor of Chemistry, Acharya Nagarjuna University, Guntur, and all the Chemistry faculty members. The Chairman formally initiated the proceedings and explained the purpose and objectives of the meeting. It was highlighted that, under the R26 Regulations, JNTUK, Kakinada has introduced a branch-specific syllabus for the Chemistry theory and laboratory courses, with the content tailored to the requirements of different engineering branches.

The Module Coordinator presented the proposed curriculum structure; titles of the theory and laboratory courses of the 6 courses offered to different engineering branches and introduced course coordinators. The respective Course Coordinators were introduced and invited to present the proposed syllabi for their assigned theory and laboratory courses. The Course Coordinators presented the course objectives, syllabus content, course outcomes, and laboratory components of the 6 Chemistry courses.

The members of the Board of Studies were requested to review the proposed branch-specific Chemistry theory and laboratory syllabi and offer their observations, suggestions, and recommendations.

Accordingly, the **following agenda items** were discussed and deliberated upon, and the corresponding decisions were taken as detailed below:

1. Modifications of contents of syllabi

The members reviewed the proposed Chemistry theory and laboratory syllabi prescribed by JNTUK, Kakinada, under the R26 Regulations for I B.Tech. I/II Semesters, with particular emphasis on their relevance, applicability, and suitability to the respective engineering branches. The members deliberated on the proposed content and suggested necessary modifications and refinements to ensure that the syllabi are appropriately aligned with the requirements of the respective branches. The agreed changes and refinements are summarized below.

Theory Courses						
Sl.	Course Title (Branch & Semester)	Modifications of contents of syllabi			Reason	Overall Remarks
		Unit (U)	JNTUK Syllabus	LBRCE Syllabus		
1	Applied Chemistry for Emerging Technolo	U-I	Schrödinger's wave equation	Added Schrödinger's wave equation (Time independent)	To make it more specific.	The committee has duly approved the changes in

	gies (ACET) CSE, AI&DS, AI&ML, CS&IT & Semester- 1	U-I	quantum numbers	Removed	The topic quantum numbers has been removed from the syllabus as the students are familiar with it from atomic structure studied at the school and Higher secondary level.	contents of syllabi.
		U-III	Dry cell, lead- acid, Ni- Cd, Ni- hydride batteries.	Removed	To reduce the syllabus load, conventional batteries have been removed, as they are already covered under electrochemistry at the higher-secondary (+2) level. Modern batteries, such as lithium-ion batteries, have been retained in the syllabus.	
		U-IV	Unit title: Sensors, biosensor s and smart materials	Renamed as E-Waste Management, Sensors, Biosensors and Smart Materials.	The title of Unit IV, “Sensors, biosensors and smart materials” was modified to reflect the inclusion of solid-waste management in the unit content.	

Sl.	Course Title (Branch & Semeste r)	Modifications of contents of syllabi			Reason	Overall Remarks
		Unit (U)	JNTUK Syllabus	LBRCE Syllabus		
2	Applied Chemistr y (AC)	U-I	Schrödin ger’s wave equation	Added Schrödinger’s wave equation (Time independent)	To make it more specific.	The committee has duly approved the changes in contents of syllabi.
	ECE & Semester -2	U-I	quantum numbers	Removed	The topic quantum numbers has been removed from the syllabus as the students are familiar with it from atomic	

					structure studied at the school and Higher secondary level.	
		U-III	Polymer s: Thermoplastics and Thermosetting Plastics, PTFE, Bakelite, Compounding of plastics.	Removed	The topic is less relevant to the core requirements of “Chemistry of Electronic Materials” and has already been covered at the school and higher-secondary levels under Polymers. Hence, it may be removed from the syllabus.	
		U-IV	Dry cell, lead-acid, Ni-Cd, Ni-hydride batteries.	Removed	To reduce the syllabus load, conventional batteries have been removed, as they are already covered under electrochemistry at the higher-secondary (+2) level. Modern batteries, such as lithium-ion batteries, have been retained in the syllabus.	

SI.	Course Title (Branch & Semester)	Modifications of contents of syllabi			Reason	Overall Remarks
		Unit (U)	JNTUK Syllabus	LBRCE Syllabus		
3	Chemistry for Civil Engineers (CCE) CE, Semester -2	U-I	Estimation of hardness by EDTA method	Removed	Since the method is already covered as a laboratory experiment, its detailed procedure is removed from the theory to avoid duplication and prevent unnecessary expansion of the theory syllabus.	The committee has duly approved the changes in contents of syllabi.
		U-IV	Polymerization mechanism	Changed to: Types of polymerization	The topic was revised to emphasize the fundamental	

			ms (addition, condensation)	(addition, condensation, excluding mechanisms)	classification of polymerization into addition and condensation types. Mechanistic details were excluded to maintain appropriate scope and focus on conceptual understanding and material-related applications.	
		U-IV	Polypropylene and epoxy resin	Moved beyond the syllabus/Self-learning	To maintain focus on the core polymer chemistry, engineering polymers, FRPs, elastomers, and composite-material concepts specified in the course. Their detailed treatment is application-specific and can be appropriately covered in advanced materials/composites courses without affecting attainment of the stated course outcomes.	
		U-IV	Natural rubber, vulcanization	Removed	These fundamental concepts are already covered at the school and Higher secondary level. The syllabus therefore emphasizes synthetic elastomers and their civil-engineering applications at an appropriate higher level.	
		U-V	Net-zero buildings (features, benefits, challenges)	Changed to: Net-zero buildings (Basic concept)	The topic has been streamlined to “Basic concept” to focus on the fundamental principles of net-zero buildings while	

					avoiding detailed features, benefits, and challenges, which are more appropriately addressed in advanced/specialized courses.	
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SI.	Course Title (Branch & Semester)	Modifications of contents of syllabi			Reason	Overall Remarks
		Unit (U)	JNTUK Syllabus	LBRCE Syllabus		
4	Chemistry for Mechanical Systems (CMS) ME, Semester -2	U-I	Colouring	Removed	The topic colouring has been removed from this unit as it is a subtopic of anodizing and the unit is already extensive. It has been included as an assignment topic/content beyond the syllabus to ensure comprehensive coverage of the subject.	The committee has duly approved the changes in contents of syllabi.
		U-I	Carbonitriding, flame hardening	Removed	Carbonitriding and flame hardening are subtopics of surface hardening and have been shifted to content beyond the syllabus/assignment work due to the extensive unit content, promoting self-learning.	
		U-II	Calorific-value determination using a bomb	Removed	To reduce the syllabus load, the determination of calorific value using a bomb calorimeter has been removed, as students perform this experiment in the laboratory. Combustion-related numerical problems	

			calorimeter, combustion problem		prescribed in the JNTUK syllabus will be discussed briefly and assigned as self-learning activities or content beyond the syllabus to promote effective learning.	
		U-II	Types of fuel cells	H ₂ -O ₂ fuel cell and PEMFC	The types of fuel cells in Unit II have been clearly specified to ensure clarity in the syllabus and facilitate effective teaching.	
		U-IV	Engineering Materials and Composites	Title modified as Engineering Materials and Solid Waste Management	The title of Unit IV, "Engineering Materials," was modified to reflect the inclusion of solid-waste management in the unit content.	

Sl.	Course Title (Branch & Semester)	Modifications of contents of syllabi			Reason	Overall Remarks
		Unit (U)	JNTUK Syllabus	LBRCE Syllabus		
5	Chemistry for Electrical Systems (CES)	U-I	Dry cell, Lithium battery, Lead-acid battery, Ni-Cd battery.	Removed	To reduce the syllabus load, conventional batteries have been removed, as they are already covered under electrochemistry at the higher-secondary (+2) level. Modern batteries, such as lithium-ion batteries, have been retained in the syllabus.	The committee has duly approved the changes in contents of syllabi.
	EEE, Semester -2	U-I	Types of Fuel cells	For more clarity, the names of the fuel cells are included	For fuel cells, two names of the fuel cells are specified as polymer electrolyte and alkaline electrolyte.	
		U-III		For more clarity, the names of the	For nanomaterial preparation, chemical vapor deposition	

			One preparati on method of nanomat erials	fuel cells are included	(CVD) method is specified	
		U-V	Schrödin ger's wave equation	Added Schrödinger's wave equation (Time independent)	To make it more specific.	
		U-V	quantum numbers	Removed	The topic quantum numbers has been removed from the syllabus as the students are familiar with it from atomic structure studied at the school and Higher secondary level.	

Note: Based on the discussions held during the BoS meeting of the Aerospace Engineering Department, it was recommended that the course title be changed from the initially proposed “Chemistry for Mechanical Systems (CMS)” to “Applied Chemistry for Aerospace Engineering (ACAE)” to enhance the relevance of the course to the Aerospace Engineering discipline.

SI.	Course Title (Branch & Semeste r)	Modifications of contents of syllabi			Reason	Overall Remarks
		Unit (U)	JNTUK Syllabus	LBRCE Syllabus		
6	Applied Chemistr y for Aerospac e Engineer ing (ACAE) ASE, Semester -2	U-I	Colouring	Removed	The topic colouring has been removed from this unit as it is a subtopic of anodizing and the unit is already extensive. It has been included as an assignment topic/content beyond the syllabus to ensure comprehensive coverage of the subject.	The committee has duly approved the changes in contents of syllabi.
		U-I	Carbonitridi ng, flame hardening	Removed	Carbonitriding and flame hardening are subtopics of surface	

					hardening and have been shifted to content beyond the syllabus/assignment work due to the extensive unit content, promoting self-learning.	
		U-II	Calorific-value determination using a bomb calorimeter, combustion problem	Removed	To reduce the syllabus load, the determination of calorific value using a bomb calorimeter has been removed, as students perform this experiment in the laboratory. Combustion-related numerical problems prescribed in the JNTUK syllabus will be discussed briefly and assigned as self-learning activities or content beyond the syllabus to promote effective learning.	
		U-II	Types of fuel cells	H ₂ -O ₂ fuel cell and PEMFC	The types of fuel cells in Unit II have been clearly specified to ensure clarity in the syllabus and facilitate effective teaching.	
		U-II	Rocket Propellants and Aviation Gasoline	Added	To make the content of the unit more relevant to ASE branch.	
		U-IV	Engineering Materials and Composites	Title modified as Engineering Materials	The title of Unit IV, "Engineering Materials," was modified to as it was not directly relevant to the intended course content.	
		U-V	Sensors	Added	To ensure better alignment with the scope and objectives of the course.	

2. Relevance and Modification of Course Outcomes (COs)

The members reviewed the proposed Course Outcomes (COs) with reference to Bloom's Taxonomy, appropriate action verbs, and the required levels of knowledge and cognitive skills. The COs were refined to ensure that they are clear, measurable, relevant, and appropriately aligned with the course content and learning objectives. The suggested modifications are given below.

Theory Courses			
Sl.	Course Title	Details of Modifications of COs	Overall Remarks/ Recommendations
1.	Applied Chemistry for Emerging Technologies (ACET)	CO1: Apply quantum chemistry principles to analyze molecular systems and explain molecular orbital theory for computing materials. (K3, K4) CO2: Analyze semiconductor materials, doping chemistry and fabrication processes used in modern electronic devices. (K3, K4) CO3: Evaluate energy-storage technologies including batteries, super capacitors and fuel cells for computing and data-centre applications. (K3, K4) CO4: Design sensors and utilize smart materials for modern devices. (K3, K4) CO5: Design advanced materials solutions using nanotechnology principles and AI-assisted tools for Nano electronics. (K5, K6) Modified as CO1: Interpret the principles of quantum chemistry, apply molecular orbital theory to explain the electronic structure and bonding in molecular systems. (K2, K3) CO2: Apply the concept of doping to prepare semiconductors, understand properties, applications of superconductors and ion-trap materials in modern electronic devices. (K3, K2) CO3: Apply electrochemical principles to assess the performance of batteries, fuel cells and explain the significance of supercapacitors in energy-harvesting applications. (K3, K2) CO4: Relate the working principles of sensors, biosensors, smart materials to their applications in modern devices and understand sustainable e-waste management practices. (K3, K2) CO5: Summarize nanomaterial synthesis methods, analyse their properties and applications, including spintronic materials. (K2, K4)	The committee has duly approved the modified CO's.
2.		CO1: Analyze corrosion mechanisms in mechanical components and recommend appropriate protection and surface-treatment methods. (K4) CO2: Evaluate fuel properties and combustion processes for engines and boilers, and assess alternative fuels for automotive applications. (K3, K4) CO3: Apply lubrication principles to select appropriate lubricants for mechanical systems based on operating conditions. (K3)	

	Chemistry for Mechanical Systems (CMS)	CO4: Analyze engineering materials and composites, relating their chemical composition and processing to mechanical properties. (K3, K4) CO5: Evaluate advanced materials and nanomaterials relevant to mechanical engineering applications. (K5, K6) Modified as CO1: Interpret the principles of corrosion, apply appropriate corrosion prevention and surface protection methods for engineering applications. (K2, K3) CO2: Explain the characteristics and processing of conventional/green fuels, apply combustion principles to energy-related engineering applications. (K2, K3) CO3: Apply the properties of lubricants and refractories to select suitable materials for mechanical and high-temperature applications. (K3) CO4: Understand the composition, properties and applications of engineering materials; apply suitable treatment and recycling methods for manufacturing waste. (K2, K3) CO5: Summarize nanomaterial synthesis methods; analyse the properties and applications of advanced materials in mechanical engineering. (K2, K3)	The committee has duly approved the modified CO's.
3.	Applied Chemistry for Aerospace Engineering (ACAE)	CO1: Analyze corrosion mechanisms in mechanical components and recommend appropriate protection and surface-treatment methods. (K4) CO2: Evaluate fuel properties and combustion processes for engines and boilers, and assess alternative fuels for automotive applications. (K3, K4) CO3: Apply lubrication principles to select appropriate lubricants for mechanical systems based on operating conditions. (K3) CO4: Analyze engineering materials and composites, relating their chemical composition and processing to mechanical properties. (K3, K4) CO5: Evaluate advanced materials and nanomaterials relevant to mechanical engineering applications. (K5, K6) Modified as CO1: Illustrate the principles of corrosion, apply appropriate corrosion prevention and surface protection methods for engineering applications. (K2, K3) CO2: Interpret the properties of aviation fuels, propellants, sustainable fuels, and fuel cells for their effective application in aerospace systems. (K2, K3) CO3: Relate lubrication mechanisms, properties to the selection of suitable lubricants and refractory materials for engineering applications. (K2, K3) CO4: Understand the composition and heat-treatment methods of ferrous alloys, processing methods of polymers, types and properties of elastomers, ceramics and composite materials; apply their characteristics to engineering applications. (K2, K3)	The committee has duly approved the modified CO's.

		CO5: Explain the properties, synthesis, working principles and applications of carbon nanomaterials, self-healing materials and sensors; relate their characteristics to engineering applications. (K2, K3)	
4.	Chemistry for Electrical Systems (CES)	CO1: Apply electrochemistry principles and evaluate corrosion mechanisms in electrical infrastructure and design appropriate protection strategies for cables, substations, and grounding systems. (K3, K5) CO2: Analyze electrochemical energy-storage systems (batteries, supercapacitors, fuel cells) and select suitable technologies for power and mobility applications. (K3, K4) CO3: Analyze and select electrical and electronic materials (conductors, semiconductors, insulators, polymers, nanomaterials) based on their chemical and physical properties. (K3, K4) CO4: Apply green chemistry and sustainability principles to evaluate renewable-energy technologies, energy efficient electrical systems, e-waste management and environmentally friendly electrical materials. (K3, K5) CO5: Apply quantum-chemistry concepts for materials and energy analysis relevant to electrical engineering. (K3, K5) Modified as CO1: Summarize electrochemical principles and corrosion mechanisms; apply appropriate corrosion-control techniques. (K2, K3) CO2: Outline the working principles of batteries, fuel cells and supercapacitors; apply their characteristics to energy-storage applications. (K2, K3) CO3: Classify electrical and electronic materials based on their properties; apply their characteristics to suitable engineering applications. (K2, K3) CO4: Compare green-energy technologies and analyse their role in sustainable electrical systems. (K2, K4) CO5: Interpret quantum chemistry principles, apply molecular orbital theory to electronic structure and bonding in molecular systems. (K2, K3)	The committee has duly approved the modified CO's.
5.	Chemistry for Civil Engineers (CCE)	CO1: Analyze important water quality parameters and explain principles of water, boiler feed water and wastewater treatment methods relevant to civil engineering applications. (K2, K3) CO2: Analyze electrochemical principles governing corrosion and evaluate corrosion-control methods, including cathodic protection, protective coating and corrosion inhibitors for civil engineering structures. (K3, K4) CO3: Explain composition and hydration chemistry of Portland cement and analyze the role of aggregates, admixtures and special cement and heat treatment process of engineering steels. (K3, K4) CO4: Classify polymers and explain polymerization mechanisms, properties and applications of engineering	The committee has duly approved the modified CO's.

		polymers, elastomers, and fibre-reinforced polymer composites in civil engineering. (K4, K5) CO5: Apply green chemistry principles to assess the environmental impacts of construction materials and processes, evaluate sustainable alternatives for reducing pollution and carbon emission in civil engineering projects. (K5, K6) Modified as CO1: Explain water quality parameters; apply appropriate water treatment processes relevant to civil engineering applications. (K2, K3) CO2: Interpret composition, properties and processing of construction materials; apply suitable principles that influence their performance. (K2, K3) CO3: Illustrate electrochemical principles and corrosion mechanisms; apply them to conductometric analysis, energy systems, and corrosion control. (K2, K3) CO4: Classify polymers and composite materials; explain polymerization mechanisms; apply polymer properties to structural engineering applications. (K2, K3) CO5: Apply green chemistry principles to analyse sustainable approaches for reducing pollution and carbon emissions in civil engineering practices. (K3, K4)	
6.	Applied Chemistry (AC)	CO1: Apply quantum chemistry principles to analyze electronic systems and predict molecular-orbital properties. (K3, K4) CO2: Analyze spectroscopic techniques for material characterization and interpret spectral data for molecular identification. (K3, K4) CO3: Evaluate semiconductor materials and chemical fabrication processes relevant to electronic-device manufacturing. (K3, K4) CO4: Analyze energy-storage systems and electrochemical principles for communication-device power management. (K3, K4) CO5: Design advanced materials solutions using nanotechnology principles and AI-assisted tools for nanoelectronics. (K5, K6) Modified as CO1: Explain the principles of quantum chemistry, apply molecular orbital theory to explain the electronic structure and bonding in molecular systems. (K2, K3) CO2: Interpret the principles and instrumentation of UV-Visible, IR, microwave spectroscopy and MRI, apply spectroscopic concepts to relevant applications. (K2, K3) CO3: Understand the principles and properties of semiconductors, superconductors, and conducting polymers; apply them to relevant electronic applications. (K2, K3)	The committee has duly approved the modified CO's.

		CO4: Summarize electrochemical principles, apply them to electrochemical calculations and energy-storage devices, including batteries, fuel cells and supercapacitors. (K2, K3) CO5: Illustrate nanomaterial synthesis methods, analyze their properties and applications, including spintronic materials. (K2, K4)	
Laboratory Courses			
1.	Applied Chemistry for Emerging Technologies Lab (ACET Lab)	CO1: Estimate fundamental physical quantities such as Planck's constant and the band-gap energy of a semiconductor from photoelectric and optical absorption measurements. (K3) CO2: Determine electrochemical parameters including EMF, specific and equivalent conductance, and pH using conductometric, potentiometric and cell-based methods. (K3) CO3: Analyze the charge-discharge characteristics and performance of batteries and supercapacitors used in computing devices. (K4) CO4: Synthesize and examine nanomaterials and evaluate their optical and adsorption properties for engineering applications. (K4) CO5: Conduct experiments safely following laboratory protocols, and record, interpret and report data working individually and in teams. (K3) Modified as CO1: Execute experimental methods to determine battery acid strength and viscosity, prepare colloidal nanoparticles, and analyse nanomaterial adsorption capacity for engineering applications. (K3, K4) CO2: Conduct potentiometric and electrochemical experiments for acid–base/redox titrations, construct an electrochemical cell, and evaluate its voltage–capacity characteristics. (K3, K4) CO3: Implement electrochemical methods to determine conductance, investigate galvanic corrosion, and analyse electrochemical biosensor performance. (K3, K4) CO4: Determine Planck's constant and semiconductor band-gap energy through experimental methods; analyse electronic-grade water using pH and conductivity measurements. (K3, K4) CO5: Conduct experiments safely, follow laboratory protocols, and record, interpret, and report data while working individually and in teams. (K3)	The committee has duly approved the modified CO's.
2.	Chemistry for Mechanical Systems Lab (CMS Lab)	CO1: Determine the calorific value, viscosity, and flash/fire point of fuels and lubricating oils using bomb calorimeter, Ostwald/Redwood viscometer, and Pensky-Martens apparatus. CO2: Perform quantitative analysis of fuel and construction material quality — proximate analysis of coal, iron content in cement, and acid/ saponification value of lubricants.	The committee has duly approved the modified CO's.

		CO3: Apply electroanalytical techniques (conductometry, potentiometry, pH-metry) to determine concentration, acid strength, and battery electrolyte characteristics. CO4: Evaluate corrosion behavior of metals (weight-loss method, galvanic coupling) and determine electroplated coating thickness using Faraday's law. Modified as CO1: Determine the calorific value, viscosity, and flash/fire point of fuels and lubricating oils using bomb calorimeter, Ostwald/Redwood viscometer, and Pensky-Martens apparatus. (K3) CO2: Perform proximate analysis of coal, estimate iron in cement, determine acid and saponification values of lubricants, and prepare polymeric resins. (K3, K4) CO3: Apply electroanalytical techniques (conductometry, potentiometry, pH-metry) to determine concentration, acid strength, and battery electrolyte characteristics. (K3) CO4: Conduct experiments safely following laboratory protocols, and record, interpret and report data working individually and in teams. (K3)	
3.	Applied Chemistry for Aerospace Engineering Lab (ACAE Lab)	CO1: Determine the calorific value, viscosity, and flash/fire point of fuels and lubricating oils using bomb calorimeter, Ostwald/Redwood viscometer, and Pensky-Martens apparatus. CO2: Perform quantitative analysis of fuel and construction material quality — proximate analysis of coal, iron content in cement, and acid/saponification value of lubricants. CO3: Apply electroanalytical techniques (conductometry, potentiometry, pH-metry) to determine concentration, acid strength, and battery electrolyte characteristics. CO4: Evaluate corrosion behavior of metals (weight-loss method, galvanic coupling) and determine electroplated coating thickness using Faraday's law. Modified as CO1: Apply analytical techniques to determine and analyze corrosion, water, electrochemical, and fuel properties. (K3) CO2: Determine the pH, acid strength, calorific value of fuels and carry out polymer preparation. (K3) CO3: Apply suitable methods to determine the significant properties of lubricants for their intended applications. (K3) CO4: Perform conductometric titrations and apply appropriate experimental techniques to characterize and evaluate the properties of nanomaterials. (K3) CO5: Conduct experiments safely following laboratory protocols, and record, interpret and report data working individually and in teams. (K3)	The committee has duly approved the modified CO's.

4.	Chemistry for Electrical Systems Lab (CES Lab)	CO1: Determine the EMF of a galvanic cell and verify the Nernst equation, and study electrochemical water electrolysis for hydrogen production. (K3). CO2: Determine resistivity and temperature coefficient of resistance of conducting wires used in electrical applications. (K3) CO3: Apply conductometric, potentiometric, and pH-metric methods to perform acid-base and redox titrations, and determine battery electrolyte strength. (K4) CO4: Verify quantum mechanical phenomena (photoelectric effect, atomic emission spectra), characterize colloidal nanoparticle size, and evaluate an enzyme-based electrochemical biosensor. (K4) Modified as CO1: Determine the EMF of a galvanic cell and verify the Nernst equation, corrosion of metals, and study electrochemical water electrolysis for hydrogen production. (K3) CO2: Determine resistivity and temperature coefficient of resistance of conducting wires used in electrical applications, properties of transformer oil. (K3) CO3: Apply conductometric, potentiometric, and pH-metric methods to perform acid-base and redox titrations. (K4) CO4: Verify quantum mechanical phenomena (photoelectric effect, atomic emission spectra), characterize colloidal nanoparticle size, evaluate an enzyme-based electrochemical biosensor and determine battery electrolyte strength. (K4) CO5: Conduct experiments safely following laboratory protocols, record, interpret and report data working individually and in teams. (K3)	The committee has duly approved the modified CO's.
5.	Chemistry for Civil Engineers Lab (CCE Lab)	Experimental details in the syllabus copy were received from JNTU-K but CO's were not provided in the syllabus copy. So, the given below CO's were framed based on the given experimental details. CO1: Apply appropriate titrimetric methods for the quantitative determination of hardness, alkalinity, and acid strength, and analyze the experimental results to evaluate the concentration of unknown samples. (K3, K4) CO2: Employ electroanalytical and instrumental techniques, including conductivity, pH measurement, and colorimetry, for quantitative chemical analysis, and analyze experimental data to determine relevant chemical parameters. (K3, K4) CO3: Perform conductometric titrations and polymer preparation techniques, and analyze experimental data to determine equivalence points and polymer properties. (K3, K4) CO4: Execute colorimetric and potentiometric techniques for quantitative analysis, and analyze	The committee has duly approved the modified CO's.

		absorbance and potential data to determine the concentration of unknown samples. (K3, K4) CO5: Conduct experiments safely following laboratory protocols, and record, interpret and report data working individually and in teams. (K3)	
6.	Applied Chemistry Lab (AC Lab)	CO1: Understand the philosophy, history, and objectives of NSS/NCC/Scouts & Guides and community service programmes (K1, K2). CO2: Demonstrate leadership, teamwork, and organisational skills through camp/parade/drill activities (K3). CO3: Plan and execute community service projects addressing social issues like health, hygiene, literacy, and environment (K3, K4). CO4: Apply first aid, disaster-preparedness, and civic responsibilities in real-world scenarios (K3). CO5: Develop civic sense, national integration, and sustainable community-development values (K5). Modified as CO1: Perform potentiometric titrations, construct an electrochemical cell, and evaluate corrosion behavior using appropriate electrochemical methods. (K3, K4) CO2: Determine battery-acid strength and Planck's constant, and analyze colored solutions using UV–Visible spectrophotometry. (K3, K4) CO3: Employ conductometric and colorimetric methods for quantitative analysis, synthesize conducting polymers, and evaluate electrochemical cell performance. (K3, K4) CO4: Conduct experimental analysis of acid concentration and polymer molecular weight, synthesize nanoparticles, and evaluate their particle size and adsorption capacity. (K3, K4) CO5: Conduct experiments safely, follow laboratory protocols, and record, interpret, and report data while working individually and in teams. (K3)	The committee has duly approved the modified CO's.

3. CO–PO Articulation Matrix

The members reviewed the proposed CO–PO Articulation Matrix for 6 Chemistry Theory and Laboratory Courses with reference to the 11 Program Outcomes (POs) prescribed by AICTE. The mapping was examined to ensure appropriate alignment between the Course Outcomes (COs), course content, and the expected graduate attributes defined by the POs. Necessary refinements were suggested to ensure relevance, consistency, and justification of the CO–PO mapping.

4. Target Values for Course Outcomes

The target values for the theory courses are fixed as 70% for the knowledge levels K1 to K3 and 65% for the knowledge levels greater than or equal to K4. However, the target values for the laboratory courses are fixed as 75% for the knowledge levels K1 to K4 and 70% for the knowledge levels greater than or equal to K5.

The CO target values for various Theory and Laboratory Courses of Chemistry Module are given as follows:

Theory Courses								
SI.	Course Title	Branch & Sem.	CO Targets & Knowledge Level					Overall Remarks/ Recommendations
			CO1	CO2	CO3	CO4	CO5	
1.	Applied Chemistry for Emerging Technologies (ACET)	CSE, AI&DS, AI&ML, IT & Semester 1	70% & (K2, K3)	70% & (K3, K2)	70% & (K3, K2)	70% & (K3, K2)	65% & (K2, K4)	The committee has duly approved the targets of CO's for all the 6 Theory courses.
2.	Chemistry for Mechanical Systems (CMS)	ME & Semester 2	70% & (K2, K3)	70% & (K2, K3)	70% & (K3)	70% & (K2, K3)	70% & (K2, K3)	
3.	Applied Chemistry for Aerospace Engineering (ACAE)	ASE & Semester 2	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K3)	
4.	Chemistry for Electrical Systems (CES)	EEE & Semester 2	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K4)	70% & (K2, K3)	
5.	Chemistry for Civil Engineers (CCE)	CE & Semester 2	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K3)	65% & (K3, K4)	
6.	Applied Chemistry (AC)	ECE & Semester 2	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K3)	70% & (K2, K3)	65% & (K2, K4)	
Laboratory Courses								
1.	Applied Chemistry for Emerging Technologies Lab (ACET Lab)	CSE, AI&DS, AI&ML, IT & Semester 1	75% & (K3, K4)	75% & (K3, K4)	75% & (K3, K4)	75% & (K3, K4)	75% & (K3)	The committee has duly approved the targets of CO's for all the 6 Laboratory courses
2.	Chemistry for Mechanical Systems Lab (CMS Lab)	ME & Semester 2	75% & (K3)	75% & (K3, K4)	75% & (K3)	75% & (K3)	-	
3.	Applied Chemistry for Aerospace Engineering Lab (ACAE Lab)	ASE & Semester 2	75% & (K3)	75% & (K3)	75% & (K3)	75% & (K3)	75% & (K3)	
4.	Chemistry for Electrical Systems Lab (CES Lab)	EEE & Semester 2	75% & (K3)	75% & (K3)	75% & (K4)	75% & (K4)	75% & (K3)	
5.	Chemistry for Civil Engineers Lab (CCE Lab)	CE & Semester 2	75% & (K3, K4)	75% & (K3, K4)	75% & (K3, K4)	75% & (K3, K4)	75% & (K3)	

6.	Applied Chemistry Lab (AC Lab)	ECE & Semester 2	75% & (K3, K4)	75% & (K3, K4)	75% & (K3, K4)	75% & (K3, K4)	75% & (K3)	
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5. Overall Remarks / Recommendations on the Proposed Syllabi

The Board of Studies approved the proposed theory and laboratory syllabi for the 6 Chemistry courses offered in the UG B.Tech. I/II Semesters under the R26 Regulations, with the understanding that the suggestions, recommendations, and modifications recorded in these minutes shall be incorporated appropriately.

6. Any other point with permission of the Chair.

- The latest editions of relevant textbooks and reference books shall be included as per given guidelines.
- The laboratory experiments shall be conducted by following appropriate safety measures and standard operating procedures.
- Any two suitable laboratory experiments may be conducted in virtual mode, wherever permitted by the academic regulations.
- The Chemistry Module Coordinator shall incorporate the approved modifications and submit the finalized syllabi to the concerned academic authorities.

Concluding Remarks

Dr. V. Parvathi, Professor & Chemistry Module Coordinator expressed her sincere gratitude to the University Nominee Dr. D. Ramachandran, Professor, Department of Chemistry, Acharya Nagarjuna University, Guntur along with Dr. T. Satyanarayana, Chairman BOS, Prof. of Physics & Head of FED and all the Course Coordinators and Chemistry faculty members for their valuable suggestions, constructive inputs, and active participation in the proceedings. The meeting concluded at 12:30 PM.

Annexures:

The Minutes of the Board of Studies Meeting, along with the approved curriculum, syllabi, CO–PO articulation matrices, and other relevant records, are enclosed as annexures for reference and record. The following annexures form an integral part of the minutes and document the deliberations, recommendations, and decisions taken during the meeting.

- i. **Annexure I:** Communications and Agenda of the Meeting
- ii. **Annexure II:** Approved Syllabi of 6 Theory & Laboratory courses of Chemistry including COs, CO-PO Articulation Matrices
- iii. **Annexure III:** Proposed R26 Regulations of JNTUK Kakinada

BoS Meeting Link of Chemistry Module:

<https://teams.microsoft.com/meet/483210781822413?p=i2bpDIUfhVdkksCcnl>

BoS Meeting Recording Video Link of Chemistry Module:

https://drive.google.com/drive/folders/18GzXhx1_SXOuF0P2kSV48LOkOwv5Yltn?usp=sharing

Date: 03-09-2026

Dr. V. Parvathi
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