

MA 2301

Ujjain Engineering College, Ujjain (MP) 456010

SYLLABUS FOR FOUR YEARS Bachelor of Technology DEGREE COURSE as per AICTE Model Curriculum

(CE/CM/EC/EE/ME Branches :: July 2018)

Subject Code	Subject Name	Semester	Periods per Week			Scheme of Examination			Total Marks	Credits
			L	T	P	ESE	MST	QAR		
MA 2002	Mathematics – II (Calculus, Ordinary Differential Equations and Complex Variable)	II	3	1	0	70	20	10	100	4

Prerequisite: Mathematics – I

Course Objective: The objective of this course is to familiarize the prospective engineers with techniques in multivariate integration, ordinary differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

Detailed Course Contents

[Total contact hours required: 55 hours]

Module 1: Multivariable Calculus (Integration): (10 lectures, 3 tutorials) [Weightage 18 marks]

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.

Module 2: First order ordinary differential equations: (8 lectures, 3 tutorials) [Weightage 14 marks]

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type. Second order linear diff. equations with constants coefficients. Cauchy-Euler equation.

Module 3: Ordinary differential equations of higher orders: (8 lectures, 3 tutorials) [Weightage 14 marks]

Second order linear differential equations with variable coefficients, Different methods of solution including the method of variation of parameters; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Module 4: Complex Variable – Differentiation: (6 lectures, 3 tutorials) [Weightage 10 marks]

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Module 5: Complex Variable – Integration: (8 lectures, 3 tutorials) [Weightage 14 marks]

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich contour.

Suggested Text/Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. R. K. Jain, S. R. K. Iyenger, Advanced Engineering Mathematics, Narosa Publications.
4. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
5. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
6. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
7. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
8. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc- Graw Hill, 2004.
9. B.S. Grewal, Higher Engineering Mathematics. Khanna Publishers. 36th Edition. 2010.

H. Palel
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Table 01: Course Outcomes (COs)

Course Outcome #	Course Outcome
CO1	The students will learn, the mathematical tools needed in evaluating multiple integrals and their usage.
CO2	The students will learn the effective mathematical tools for the solutions of ordinary differential equations of first order first degree and first order higher degree that model physical processes.
CO3	The students will learn the effective mathematical tools for the solutions of ordinary differential equations of higher orders that model physical processes.
CO4	The students will learn the tools of differentiation of functions of a complex variable that are used in various techniques dealing engineering problems.
CO5	The students will learn The tools integration of functions of a complex variable that are used in various techniques dealing engineering problems.

Table 02: Mapping of Course Outcomes with Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	-	-	-
MA 2002	3	3	2	-	-	-	-	-	-	-	-	-

Policy for Attendance:

Attendance in lectures and tutorials is compulsory. Please ensure that your attendance is marked on the attendance sheet, and that this is done no later than the first five minutes of the class. There will be maximum 5% marks for attendance which will be awarded as follows:

Attendance	Marks	Attendance	Marks
$\leq 40\%$	1.0	$61\% \leq 80\%$	3.5
$41\% \leq 60\%$	2.5	$81\% \leq 100\%$	5.0

Evaluation Plan:

1. There will be two assignments. Each assignment will carry 1% weightage. Dates, timings and syllabus for assignment 1 and assignment 2 will be announced later in the class.
2. There will be two quizzes. Quizzes will be conducted in the tutorial class. Each quiz will be of 30 minutes duration and will carry 1.5% weightage. Dates, timings and syllabus for Quiz 1 and Quiz 2 will be announced later in the class. Questions in Quiz 1 and Quiz 2 will be asked from the tutorial sheets.
3. The Mid-Semester examination, will be of 20% weightage. The syllabus for Mid-Sem examination will be announced later in the class. Questions in MSTs may be asked from the tutorial sheets. The End Semester Examination will be of 70% weightage, and will cover all the topics.

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Ujjain Engineering College, Ujjain (MP) 456010

SYLLABUS FOR FOUR YEARS Bachelor of Technology DEGREE COURSE as per AICTE Model Curriculum

(Computer Science & Engineering branch :: July 2018)

Subject Code	Subject Name	Semester	Periods per Week			Scheme of Examination			Total Marks	Credits
			L	T	P	ESE	MST	QAR		
MA 2302	Mathematics – II (Differential Calculus & Ordinary Differential Equations)	II	3	1	0	70	20	10	100	4

Prerequisite: Mathematics-I

Course Objective: The objective of this course is to familiarize the prospective engineers with techniques in multivariate calculus and ordinary differential equations. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

Detailed Course Contents

[Total contact hours required: 55 hours]

Module 1: Sequences and series: (8 lectures, 3 tutorials) [Weightage 14 marks]

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Module 2: Multivariable Calculus (Differentiation): (8 lectures, 3 tutorials) [Weightage 14 marks]

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

Module 3: Multivariable Calculus (Integration): (8 lectures, 3 tutorials) [Weightage 14 marks]

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.

Module 4: First order ordinary differential equations: (8 lectures, 3 tutorials) [Weightage 14 marks]

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type. Second order linear diff. equations with constants coefficients. Cauchy-Euler equation.

Module 5: Ordinary differential equations of higher orders: (8 lectures, 3 tutorials) [Weightage 14 marks]

Second order linear differential equations with variable coefficients, Different methods of solution including the method of variation of parameters, Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Suggested Text/Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. R. K. Jain, S. R. K. Iyenger, Advanced Engineering Mathematics, Narosa Publications.
4. R. K. Jain, S. R. K. Iyenger, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India.



Ujjain Engineering College, Ujjain							
BE I/II SEMESTER WEF: JULY 2018							
COURSE CONTENTS(CBGS)							
CH 1301	Chemistry	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	22

Course Objective:

The course introduces students to the role of engineering chemistry in their field as an engineer. The students are expected to learn the chemistry which is useful to enhance their skill & knowledge. The students can apply knowledge gained in dealing with various projects or issues related with their work.

Unit I

WATER ANALYSIS & TREATMENT:

Sources, Impurities, Hardness & its units, Softening of water by Lime -Soda method, Boiler troubles (Scale and sludge, Caustic embrittlement, Boiler corrosion, Priming & foaming), Internal treatments of boiler feed water, Water analysis (determination of alkalinity, temporary and permanent hardness by complexometry). Numerical problems based on above water softening process & water analysis. (10 lecture)

Unit II

PERIODIC PROPERTIES:

Effective nuclear charge, penetration of orbitals, variation of s,p,d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarisability, oxidation states, coordination number and geometries, hard soft acids and bases, molecular geometries. (8 lecture)

Unit III

LUBRICANTS & LUBRICATION:

Introduction, Mechanisms of lubrication, Classification of lubricants. Significance and determination of Viscosity & viscosity index, Flash and fire points, Cloud and pour points, Aniline point, Acid Number, Saponification Number, Steam Emulsion Number. (6 lecture)

Unit IV

POLYMERS & POLYMERISATION:

Monomers, Polymers, their classification, Thermo & Thermosetting Plastics with examples, Bio-Polymerization, Biodegradable Polymers, Preparation, Properties & Applications of PVC, PVA, Teflon, Nylon 6, Nylon 6:6, Polyester, Phenol-Formaldehyde, Urea- Formaldehyde, Natural & Synthetic Rubbers, Vulcanization of Rubber.(8 lecture)

Unit V

PHASE EQUILIBRIUM & CORROSION :

Phase diagram of single component systems (Water & CO₂), Phase diagram of binary Eutectic System(Pb-Ag), Corrosion: Types, Mechanisms & prevention.(8 lecture)

Course Outcome:

Students after completion of the course must possess understanding & knowledge of Engineering Chemistry which is significant for them and will earn respective credits for it.

Evaluation:

Evaluation will be continuous an integral part of the class as well as through external assessments.

REFERENCES:

1. Chemistry in Engineering and Technology, Vol-I & Vol -II, J.C. Kuriacose and J. Rajaram, Tata McGraw Hill, New Delhi
2. A Text Book of Engineering Chemistry - S. S. Dara & A.K. Singh, S. Chand Publications, New Delhi
3. Engineering chemistry - Jain and Jain, Dhanpat Rai publications, New Delhi
4. Engineering chemistry – Shashi Chawla , Dhanpat Rai publications, New Delhi
5. Engineering Chemistry, Subha Ramesh & Others, Wiley India Pvt.Ltd., New Delhi
6. Chemistry of Engineering Materials, C.V. Agrawal, C.P. Murthy & A. Naidu, B S Publications, Hyderabad
- 7.Engineering Chemistry- B.K.Sharma, Krishna Prakashan Media (P) Ltd, Meerut.

Dr. Anil Kumar
6.7.19
(C Dr. Anil Kumar)

Dr. Savita Dixit
6.7.19
(DR. Savita DIXIT)

Dr. Anish Singh
6.7.19
Dr. Anish Singh

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Chemistry Practical

NOTE: About 10 of the following core experiments must be performed during the session.

1. **Water Testing**
 - (i) Determination of Total hardness of water by EDTA titration method.
 - (ii) Determination of alkalinity of water sample by titration.
 - (iii) Chloride estimation in water by Argentometric titration.
2. **Fuels & lubricant testing:**
 - (i) Flash & fire point determination by
 - a) Pensky's Martin Apparatus,
 - b) Abel's Apparatus,
 - c) Cleveland's open cup Apparatus.
 - (ii) Viscosity and Viscosity index determination by
 - a) Redwood viscometer No.1
 - b) Redwood viscometer No.2
 - (iii) Determination of Moisture content in fuel
3. Identification of functional groups of organic compounds/ Determination of melting/ boiling point of organic compounds.
4. **Measurement of kinetics of simple reactions.**
5. **Redox titrations:**

Determination of percentage purity of Ferrous salt or percentage of Fe in an iron alloy by redox titration using N-Phenyl Anthranilic acid as an indicator.

Dr. S. K. Mishra
6.7.19

(Dr. S. K. Mishra)

MIXIT
6.7.19

(Dr. Savitri DIXIT)

Dr. Anurag
6.7.19

Dr. Anurag

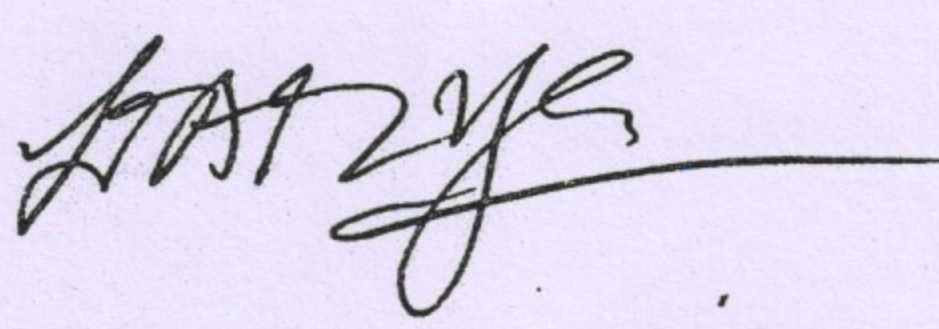
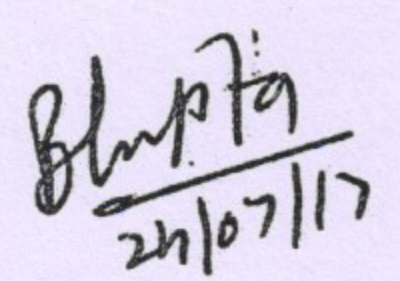
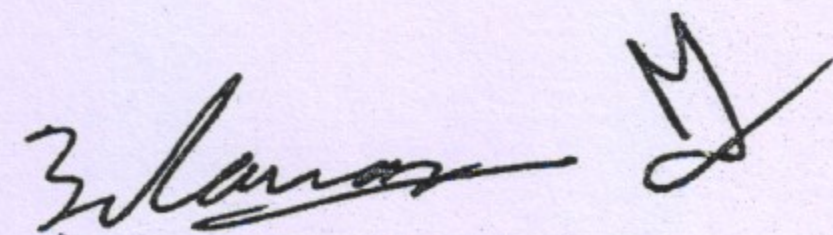
1. **D.C. Circuits:** Circuit reduction by series, parallel, star delta transformation, circuit analysis by mesh and nodal method, voltage and current source representation, dependent and independent sources, source conversion, superposition theorem, Thevenin's theorem.
2. **A.C. Circuits:** Generation of alternating voltages, RMS & average value, form and peak factors, phasor representation polar, rectangular and exponential form, circuit parameters, R-L, R-C and RLC series, parallel and series parallel circuits. Instantaneous and average power, active and reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections.
3. **Magnetic Circuits:** Flux MMF and their relation, analogy between magnetic and electric circuits, saturation, B-H curves, fringing and leakage flux, AC excitation in magnetic circuits, induced voltage, hysteresis effect and eddy currents.
4. **Transformer** - Single-phase transformer, basic concepts and constructional features, types of transformer, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test. All day efficiency
5. **Rotating Electrical machines:** Constructional features and working principle of DC machine, 3-Phase induction motor and synchronous machine.

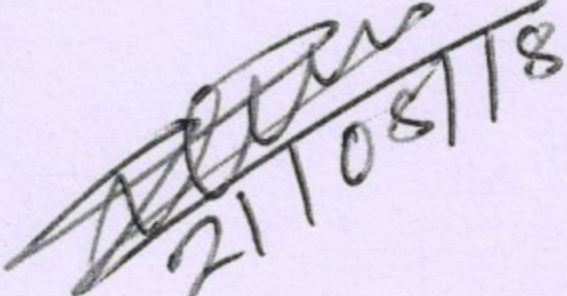
References-

1. Vincent Del Toro - Electrical Engineering Fundamentals, PHI Learning
2. Nagrath & Kothari - Basic Electrical Engineering, TMH.
3. Mittle & Mittal - Basic Electrical Engineering, III Edition TMH.
4. Cathey - Basic Electrical Engineering, Schaum Series, TMH.
5. Hughes - Electrical Technology, Pearson
6. Fitzarald & Batham - Basic Electrical Engineering.

List of Experiments

1. Verification of KCL & KVL.
2. Study & measurement of power and power factor in R-L series circuit.
3. Study & measurement of power and power factor R-C series circuit.
4. Study & measurement of power and power factor R-L-C series circuit.
5. Study of Transformer.
6. Determination of equivalent circuit parameters by O.C. and S.C. test & estimation of voltage regulation & efficiency of transformer.
7. Measurement of various lines and phase quantities for a 3 phase circuit.



July, 2018

ME1301							
B.E. I/II SEMESTER							
COURSE CONTENTS (CBGS SCHEME)							
	Engineering Graphics	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	2	0	4	4	70	22

Unit I

Scales: Representative fraction, plain scale, diagonal scale, scale of chord.

Conic Sections: Construction of ellipse, parabola and hyperbola by different methods, normal and tangent.

Special Curves: Cycloidal, involutes, Archimedean and logarithmic spirals.

Unit II

Projection: Types of projection, orthographic projection, first angle and third angle projection, projection of points and lines, true inclinations and true length of straight lines, traces of straight lines, projection on auxiliary planes.

Unit III

Projection of Plane and Solids: Projection of circle, triangle and polygons, projection of polyhedrons, pyramids in different positions.

Unit IV

Section of Solids: Section of right solids by normal and inclined planes,

Development of Surfaces: Parallel line and radial line method for right solids.

Unit V

Isometric Projections: Isometric scale, isometric axes, isometric projection from orthographic projections.

Conversion of pictorial view into orthographic view of simple wall brackets, bearing blocks and simple blocks.

Books Recommended:

1. Engineering Drawing by N.D. Bhatt and V.M. Panchal; Charotar Publishing House Pvt. Ltd.
2. Engineering Drawing and Graphics by Basant Agrawal and C.M. Agrawal; McGraw Hill.
3. Engineering Graphics by D.A. Hindoliya; B.S. Publications.
4. Engineering Drawing by P.S. Gill; S.K. Kataria and Sons.
5. Machine Drawing by N.D. Bhatt; Charotar Publishing House Pvt.
6. Engineering Drawing and Graphics by K. Venugopal; New Age International.

During laboratory session: Students will solve the drawing problems from every unit.

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08/08/2018

Rajkumar Porwal
08/08/2018

I/II SEMESTER							
COURSE CONTENTS (CBGS)							
EN-1201	Communication Skills	L	T	P	C	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	6	70	22

Unit I

Languages and skills of communication: linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/ signs, Oral presentation, Audition Communication, Processes of communication, Verbal and Non Verbal Communication, Barriers to Communication.

Unit II

Application of linguistic ability: Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc.

Unit III

Letter Writing: Applications, Enquiry, Calling quotations, Tenders, Order and complaint.

Unit IV

Precise Writing, Noting and drafting, Technical Descriptions of simple engineering objects and processes (Writing), Report writing, Précis writing, note writing, slogan writing comment, speech advertising.

Unit V

Writing technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and Project Report on the subjects of engineering. (Speaking) Vocabulary, Presentations, Demonstrations, Conversation - Telephone media, socializing, cultural events, debates, speech.

Reference Books and software's: -

1. Business Correspondence and Report Writing - By Sharma, TMH.
2. Living English Structure - By W. S. Allen, Longmans.
3. English Grammar- Ehrlich, Schaum Series, TMH
4. Spoken English for India - By R.K. Bansal and IB Harrison (Orient Longman).
5. New International Business English - By Joans and Alexander (OUP).
6. Effective Technical Communication- Rizvi, TMH
7. Globerina software for language laboratory

Language Laboratory:

The objective of the language lab is to expose students to a variety of listening and speaking drills. This would especially benefit students who are deficient in English and it also aims at confidence building for interviews and competitive examinations. The Lab is to cover following syllabus.

1. Communication lab.
2. Listening skills.
3. Speaking skills.
 - (A) Phonetic symbols, pronunciation.
 - (B). conversation: telephonic, face to face, formal and informal situations
4. Oral presentation.

23.9.17

25.9.17