2018.1.12   शैक्षिक सत्र 2017-18 के इवेन सेमेस्टर के समस्त B.Tech. पाठ्यक्रमों हेतु बोर्ड आफ स्टडीज द्वारा अनुमोदित परीक्षकों की सूची का अवलोकन एवं विभिन्न स्नातक पाठ्यक्रमों के सैलेबस में आंशिक संशोधन सहित सत्र 2018-19 से प्रभावी किये जाने एवं बी0टेक0 केमिकल इंजी0 के पंचम सेमेस्टर के सैलेबस का अनुमोदन।

शैक्षिक सत्र 2017-18 के इवेन सेमेस्टर के समस्त B.Tech. पाठ्यक्रमों हेतु विभागीय बोर्ड आफ स्टडीज द्वारा संस्तुत लिखित एवं प्रायोगिक परीक्षा का पैनल प्राप्त किया गया, जिसे मा0 कुलपति महोदय के अनुमोदनोपरान्त परीक्षा नियंत्रक को अग्रिम कार्यवाही हेतु प्रेषित किया जायेगा।

विद्या परिषद के अनुमोदनार्थ निम्न प्रस्ताव प्रस्तुत है:-

1. रासायन अभि0 विभाग के पंचम सेमेस्टर का पाठ्यक्रम विद्या परिषद के अवलोकनार्थ निम्नवत् पृष्ठ संख्या **126** से पृष्ठ संख्या **135** पर संलग्न है:-

विषय कोड	विषय का नाम	प्रभावी होने का सत्र
BCT - 25	Chemical Technology	
BCT - 26	Mass Transfer - I	
BCT - 27	Suger Production	2018-19
BCT - 28	Chemical Engineering Thermodynamics - II	

2. निम्न विभागो द्वारा पाठ्यक्रमों में किये गये संशोधन पृष्ठ संख्या **136** से पृष्ठ संख्या **147** पर संलग्न है। पाठ्यक्रमों का विवरण निम्नवत् है:-

विभाग	विषय कोड	विषय का नाम	प्रभावी होने का सत्र
विद्युतकण एवं संचार अभि0 विभाग	BEC-28 A	Principles of Communication	
	BEC-32 A	Microprocessors & Applications	2018-19
	BEC-31 A	Digital Communication	
	BEC-26 A	Control Systems	
	BEC-67 A	RFICs	
विद्युत अभि0 विभाग	BEE - 14 A	Network Analysis and Synthesis	
	BEE - 15 A	Microprocessor: Architecture, Programming and Interfacing	2018-19
	BEE - 20 A	Simulation Techniques Lab	
प्रयुक्त विज्ञान विभाग	BAS - 11 A	Human Values & Professional Ethics	2018-19

3- विद्युत अभि0 विभाग के बी0टेक0 चतुर्थ वर्ष, अष्टम सेमेस्टर के विषय BEE-44 (Utilization & Traction) जो लिपिकीय त्रुटिवश बी0टेक0 विद्युत अभि0 के क्रेडिट स्ट्रक्चर में 4 क्रेडिट के स्थान पर 5 क्रेडिट का अंकित हो गया है, संशोधन हेतु पृष्ठ संख्या **147a** से पृष्ठ संख्या **147e** पर संलग्न है।

विद्या परिषद के माननीय सदस्यों से अनुरोध है कि कृपया उक्त का अनुमोदन प्रदान करने की कृपा करें।

Department of Computer Science & Engineering
Madan Mohan Malaviya University of Technology, Gorakhpur-273 010 India

January 29, 2018

<u>Dean UGS and E</u>

Board of Studies meeting was held on 27.01.2018. Kindly find attached herewith recommended panel of examiners list for B Tech (CSE).
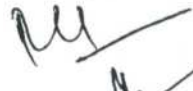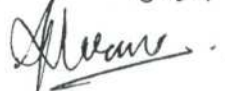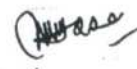
29/01/2018

(Prof Rakesh Kumar)
Prof & Head

Encl.

1. As above.

A Board of Studies meeting was held on 27.01.2018 in the Karmarker Hall of the department at 11:30 A.M.. Following were present in the meeting.

1. Prof. Rakesh Kumar
2. Prof. Udai Shankar
3. Prof. P. K. Singh
4. Prof. A. K. Daltel — On Leave
5. Prof. A. K. Sharma
6. Prof. S. P. Singh
7. Prof. Shiva Prakash
8. Prof. U. C. Jaiswal
9. Sri D. S. Singh
10. Dr. Divakar Yadav
11. Sri Jay Prakash
12. Sri M. K. Srivastava
13. Smt. Meenu
14. Sri Muzammil Hasan
15. Sri R. K. Dwivedi
16. Sri R. K. Tiwari
17. Sri S. L. Saroj
18. Dr. N. P. Singh

Following external members were also present in the meeting.

1. Prof. M. M. Gore   27-01-2018
2. Dr. S. K. Singh
3. Sri Harish Tiwari

Prof. K. G. Professor C.S.E. dept would

following decisions were taken unanimously.

(i) List of external members for paper setting, practical and project examination was discussed and approved. There were some minor modifications in the proposed list due to change in affiliation of some of the external members.

(ii) It was decided to make the syllabus of MTA(?) more practical oriented according to the needs of the industry.

(iii) It was decided to take functional programming part out of the syllabus of BCS-02 and make it part of Software lab-1.

(iv) It was decided that all the core courses of computer science like data structures must have a corresponding practical component.

M.K.
27.01.2018

27/01/10

27/01/2018

27/01/2018

Tivakar
27/01/2018

2018.2.19 विश्वविद्यालय के आगामी शैक्षणिक सत्र 2018-19 हेतु विभिन्न विभागो द्वारा स्नातक पाठ्यक्रमों में किये गये संशोधनों (स्नातक पाठ्यक्रमों में कोई नया विषय आरम्भ किया जाना है, किसी विषय के **Credit Structure** में कोई संशोधन किया जाना है अथवा किसी विषय के पाठ्यक्रम में संशोधन) तथा बी0टेक0 केमिकल इंजी0 के पंचम सेमेस्टर पर विचार एवं अनुमोदन।

विश्वविद्यालय के आगामी शैक्षणिक सत्र 2018-19 हेतु विभिन्न विभागो द्वारा स्नातक पाठ्यक्रमों में किये गये संशोधनों (स्नातक पाठ्यक्रमों में कोई नया विषय आरम्भ किया जाना है, किसी विषय के Credit Structure में कोई संशोधन किया जाना है अथवा किसी विषय के पाठ्यक्रम में संशोधन) तथा बी0टेक0 केमिकल इंजी0 के पंचम सेमेस्टर पर विचार एवं अनुमोदन।

1. निम्न विभागो द्वारा अपने बी0टेक0 पाठ्यक्रमों के सैलेबस में किये गये संशोधन पृष्ठ संख्या 234 से पृष्ठ संख्या 347 पर संलग्न है। पाठ्यक्रमों का विवरण निम्नवत् है:-

विभाग	पाठ्यक्रम	प्रभावी होने का सत्र
जनपदीय अभियंत्रण विभाग	बी0टेक0	2018-19
यांत्रिक अभि0 विभाग	बी0टेक0	2018-19
केमिकल इंजी0 विभाग	बी0टेक0 (तृतीय, चतुर्थ एवं पंचम सेमेस्टर)	2018-19

2. रासायन अभि0 विभाग के षष्टम् सेमेस्टर का पाठ्यक्रम विद्या परिषद के अवलोकनर्थ

विषय कोड	विषय का नाम	प्रभावी होने का सत्र
BCT - 31	Alcohol Technology	
BCT - 32	Mass Transfer - II	
BCT - 33	Process Dynamics, Control & Instruementation	2018-19
BCT - 34	Chemical Reaction Engineering	

3. बी0 टेक0, रासायन अभियंत्रण विभाग के द्वितीय वर्ष के छात्रों हेतु सत्र 2018-19 से आरम्भ किये जा रहें आडिट विषय Polymer Chemistry (BAS-32) के सैलेबस का अनुमोदन।

विद्या परिषद के माननीय सदस्यों से अनुरोध है कि कृपया उक्त का अनुमोदन प्रदान करने की कृपा करें।

Minutes of the Board of Studies meeting held in the Karmarkar Hall on 21.05.2018 at 10:30 AM. Following members were present:

1. Dr. Rakesh Kumar — Chairman
2. Sri Harshit Tiwari — System Engineer, TCS-Lucknow (External Member)
3. Dr. Udai Shanker — Professor
4. Dr. P. K. Singh — Professor
5. Dr. A. K. Sharma — Professor
6. Dr. A. K. Daniel — Professor
7. Dr. U. C. Jaiswal — Professor
8. Dr. S. P. Singh — Professor
9. Dr. Shiva Prakash — Professor (On leave)
10. Dr. Divakar Yadav — Assoc. Prof.
11. Sri D. S. Singh — Assoc. Prof.
12. Sri Jay Prakash — Assist. Prof. (On leave)
13. Sri M. K. Srivastava — Assist. Prof.
14. Sri M. Hasan — Assist. Prof.
15. Ms. Meenu — Assist. Prof.
16. Sri R K Dwivedi — Asstt. Prof.
17. Sri R. K. Tiwari — Assist. Prof.
18. Sri S. K. Saroj — Assist. Prof.
19. Dr. N. P. Singh — Assist. Prof.
20. Dr Harish Chandra — Assist. Prof., ASD (Special invitee)
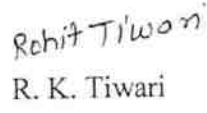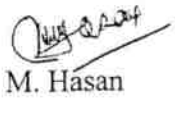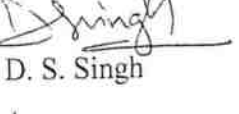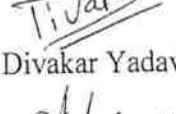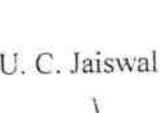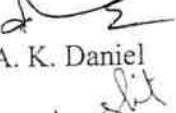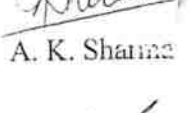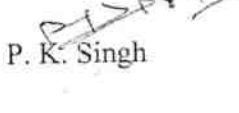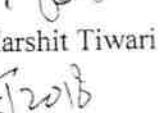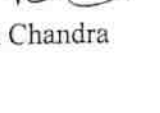
Following External Members could not attend the meeting due to their pre-occupancy in their parent organization

1. Prof. A.K. Singh, NIT-Kurukshetra
2. Prof. M.M. Gore, MNNIT- Allahabad
3. Dr. S.K. Singh, IIIT-Allahabad

The following decisions were taken-

1. Committee thoroughly look into the present M.Tech (CSE & IT) course curriculum and finalized revised course structure/syllabi as per the industry need to enhance the student's employability. (attached at Annexure-1)
2. Committee thoroughly look into the present B.Tech CSE and MCA course curriculum and finalized revised syllabus of some subjects as per the industry need to enhance the student's employability. (attached at Annexure-2 & Annexure- 3 respectively).
3. Dr Harish Chandra, ASD agreed to float the subject :Mathematical Foundations of Computer Science (MAS-213) from his department.

Finally, the meeting ended with vote of thanks to the chair.

N. P. Singh   S. K. Saroj   R. K. Tiwari   R K Dwivedi   Smt. Meenu

M. Hasan   M. K. Srivastava   D. S. Singh   Divakar Yadav

S. P. Singh   U. C. Jaiswal   A. K. Daniel   A. K. Sharma

P. K. Singh   Udai Shanker   Harshit Tiwari   Harish Chandra

Rakesh Kumar

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ANNEXURE-2

BCS-04A   **OBJECT ORIENTED MODELING & C++**

Course Category	: Engineering Fundamental (EF)
Pre-requisite Subject	: NIL
Contact Hours/Week	: Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits	: 5
Course Assessment Methods	: Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and Three Minor tests and One Major Theory & Practical Examination
Course Outcomes	: The students are expected to be able to demonstrate the following knowledge, skills, and attitudes after completing this course

1. Understand the Concept of Object Oriented Programming and Master OOP using C++
2. Implementing the Real-Life Problems using Object Oriented Techniques.
3. Improvement in Problem Solving Skills.

UNIT-I   9
Object Modeling: Objects and Classes, Links and Associations, Generalization and Aggregation, Metadata, Candidate Keys, Constraints, Dynamics Modeling: State and State Diagram, Functional Modeling: Data Flow Diagram

UNIT-II   9
Object Oriented Programming: Features of Object Oriented Programming, C++ Fundamentals: data types, Operators and Expressions, Reference variables, Control flow, Arrays, Structures, Strings, Pointers and Functions, Overloading functions, Friend Function.

UNIT-III   9
Defining Class, creating objects and accessing its member, Constructors and Destructors, Operator overloading and Type conversions, Inheritance and Polymorphism: Single inheritance, multi-level inheritance, multiple inheritance, hierarchical inheritance, runtime polymorphism, Virtual Functions and Abstract class.

UNIT-IV   9
Templates and Exception Handling: Use of templates, function templates, class templates, handling exceptions. File handling: Stream in C++, Files modes, File pointer and manipulators, type of files, accepting command line arguments, Standard template library.

EXPERIMENTS
Write C++ Programs to illustrate the concept of the following:
1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O Operations
6. Scope Resolution and Memory Management Operators
7. Inheritance
8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator Overloading
12. Function Overloading
13. Constructors and Destructors
14. this Pointer
15. File I/O Operations

Analyse, Design and Develop Code for the Following System (one for a batch of three students) using C++

1. ATM (Automated Teller Machine) System
2. Contact Management System
3. Employee Record Management System
4. Stock Maintenance System
5. Course Registration System
6. Payroll System
7. Library Management System
8. Calendar

Textbooks

1. B. Trivedi Programming with ANSI C++, Oxford University Press, 2007.
2. Ira Pohl, Object Oriented Programming using C++, Pearson Education, Second Edition
3. B. Stroustrup, The C++ Programming Language, 3rdedition, Pearson Education, 2004
4. James Rumbaugh, et. al Object Oriented Modeling and Design-, PHI
5. Robert Lafore, Object Oriented Programming in Turbo C++, Galgotia Publication, 1994
6. E. Balaguruswamy, Object Oriented Programming with C++, TMH Publication
7. Grady Booch, James Rumbaugh and Ivar Jacobson The Unified Modeling Language User Guide, Pearson Education
8. Booch, Maksimchuk, Engle, Young, Conallen and Houstan, Object Oriented Analysis and Design with Applications, Pearson Education
9. S. B. Lippman, Josee Lajoie, Barbara E. Moo, C++ Primer,4th edition, Pearson Education, 2005

Reference Books

1. Coleman, D. et.al. Object-Oriented Development, The Fusion Method. Prentice Hall
2. Booch, G. Object-Oriented Design with Applications. Redwood City, Bengamin/Cummings
3. Sartaj Sahni, Data Structures, Algorithms and Applications in C++, McGraw Hill, Second Edition, 2005.

BCS-13A   Internet & JAVA Programming

Course category	:	Department Core (DC)
Pre-requisites	:	NIL
Contact hours/week	:	Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits	:	5
Course Assessment methods	:	Continuous assessment through tutorials, attendance, home assignments, quizzes, practical work, record, viva voce and Three Minor tests and One Major Theory & Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. To identify different components of client server architecture on Internet computing.
2. Knowledge of how to develop and deploy applications and applets in JAVA.
3. Knowledge of how to develop and deploy GUI using Java Swing and AWT.
4. Design, develop and implement interactive web applications.
5. Be able to implement, compile, test and run JAVA programs comprising more than one class and to address a particular software problem.
6. To understand the basic concepts of Internet services and related technologies.
7. Develop programs using the JAVA Collection API as well as the JAVA standard class library.

UNIT-I

Internet: Introduction to Internet Services, Core Java: Introduction, Operator, Data type, Variables, Control 9
Statements, Arrays, Methods & Classes, Constructors, String Handling, Inheritance, Package and Interface.

UNIT-II

Exception Handling, Multithread programming, I/O, Java Applet, Networking, Event handling, Introduction to 9
AWT, AWT controls, Layout managers.

UNIT-III

Java Swing: Creating a Swing Applet, Labels, Text fields, Buttons, Tabbed Panes, JDBC: Connectivity Model, 9
JDBC/ODBC Bridge, JAVA SQL package, connectivity to Remote Database, Remote method invocation (RMI).

UNIT-IV

Java Beans: Application Builder tools, The Bean Developer Kit(BDK), JAR files, Introspection, developing a simple 9
bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Java Servlet: Servlet
Basics, Servlet API basic, Life cycle of a Servlet, Running Servlet.

EXPERIMENTS

1. Basic programs of simple statements, conditional statements, iterative statement, and arrays.
2. Programs having object-oriented concepts like Inheritance and Interface.
3. Programs for Exception Handling and Event Handling.
4. Programs of Threads and Multithreading.
5. Programs related to Applets and Swings.
6. Program including JAVA Beans and Servlets.

Textbooks

1. Naughton, Schildt, "The Complete Reference JAVA2", TMH.
2. Balagurusamy E, "Programming in JAVA", TMH

Reference Books

1. Margaret Levine Young, "The Complete Reference Internet", TMH.
2. Dustin R. Callway, "Inside Servlets", Addison Wesley.
3. Mark Wutica, "Java Enterprise Edition", QUE.
4. Steven Holzner, "Java2 Black book", Dreamtech.

BCS-80   PROGRAMMING IN C

Course Category: Engineering Fundamental (EF)
Pre-requisite Subject: NIL
Contact Hours/Week: Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits: 5
Course Assessment Methods: Continuous assessment through tutorials, attendance, home assignments, quizzes,
practical work, record, viva voce and Three Minor tests and One Major Theory & Practical Examination.
Course Outcomes: The students are expected to be able to demonstrate the following knowledge, skills and
attitudes after completing this course.

1. Basic Terminology used in Computer Programming.
2. Programs Development in C Language by Writing, Compiling and Debugging.
3. Design of Programs involving Simple Statements, Conditional Statements, Iterative Statements, Array,
   Strings, Functions, Recursion, Structure and Union.
4. Difference between Call by Value and Call by Reference.
5. Dynamic Memory Allocations and Use of Pointers.
6. Basic Operations on a File.
7. Basics of Dynamic Memory.

UNIT-I   9

Basics of Programming: Approaches to Problem Solving, Concept of Algorithm and Flow Charts, Types of Computer Languages-Machine Language, Assembly Language and High-Level Language, Concept of Assembler, Compiler, Loader and Linker. Data types, Operators, Expressions, Operator Precedence and Associativity.

Fundamentals of C Programming: Structure of C Program, Writing and Executing the First C Program, Components of C Language, Standard I/O, Formatted I/O.

Conditional Program Execution: Applying if and switch Statements, Nesting if and else.

Program Loops and Iterations: Use of while, do while and for Loops, Multiple Loop Variables, Use of break and continue Statements, goto Statement.

UNIT-II   9

Arrays: One Dimensional, Multidimensional Array and Their Applications, Declaration and Manipulation of Arrays.

Strings: String Variable, String Handling Functions, Array of Strings.

Functions: Designing Structured Programs, Functions in C, User Defined and Standard Functions, Formal vs. Actual Arguments, Function Category, Function Prototype, Parameter Passing, Recursive Functions.

Storage Classes: Auto, Extern, Register and Static.

UNIT-III   9

Pointers: Pointer Variable and its Importance, Pointer Arithmetic Pointers and Arrays, Pointer and Character Strings, Pointers and Functions, Array of Pointers, Pointers to Pointers.

Structure: Declaration and Initialization of Structures, Structure as Function Parameters, Structure Pointers.

Union: Declaration and Initialization of Unions, Union as Function Parameters, Union Pointers.

UNIT-IV   9

Dynamic Memory Allocation: malloc, calloc, realloc, free function.

File Management: Defining and Opening a File, Closing a File, Input/ Output Operations in Files, Random Access to Files, Error Handling.

The Pre-processor Directives, Macros, Command Line Arguments, Introduction to Graphics Programming.

EXPERIMENTS

1. Write programs to print statements in sequential order using simple printf, scanf input/output functions.
2. Write programs to implement *if-else* condition (simple as well as nested) on suitable problems.
3. Write program to implement *switch-case* conditional logic on suitable examples.
4. Write programs to implement *for, while* and *do-while* loop control statements on suitable problems.
5. Write programs to implement 1D & 2D array concepts on suitable problems such as sorting of elements, searching of element, matrix addition, subtraction, multiplication etc.
6. Write programs to implement string related concepts such as sorting of a string, finding its length, reversing, concatenation, comparing two strings etc.
7. Write programs to implement concept of user defined functions (call by value, call by reference, recursive calling etc.) on suitable examples.
8. Write programs to implement concepts of pointer.
9. Write programs to implement the concept of structure and union.
10. Write programs to implement dynamic memory allocation functions (calloc, malloc, free, realloc)
11. Write programs to implement file handling concepts such as reading from a file, writing to a file using file related functions (fclose, fopen, sscanf, sprint, fread, fwrite, getc, putc, getw, putw etc.)

Textbooks

1. Jeri R. Hanly and Elliot B. Koffman, Problem Solving and Program Design in C, 7th Edition, Pearson.
2. Schildt, Herbert, Complete Reference with C, Tata McGraw Hill.
3. Kerninghan and Ritchie, The C programming Language, 2nd Edition, Prentice Hall.
4. Richard Bird, Introduction to Functional Programming using Haskell, 2nd Edition, Prentice-Hall International, 1998.

Reference Books

1. Greg Michaelson, An Introduction to Functional Programming Through Lambda Calculus, Dover Edition, Addition Wesley Publication.
2. Samuel P. Harbison, and Guy L. Steele Jr., C-A Reference Manual, Fifth Edition, Prentice Hall, 2002.

DEPARTMENT OF APPLIED SCIENCES
MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY
GORAKHPUR

Minutes of Board of Studies of Department of Applied Sciences M.M.M. University of Technology, Gorakhpur held on Dated: 23.09.2017

The Following were present:-

1.	Dr. B. K. Pandey	Chairman
2.	Prof. D. K. Dwivedi	Member Internal
3.	Dr. D. Kandu	Member Internal
4.	Dr. P.P. Pande	Member Internal
5.	Dr. S.P. Singh	Member Internal
6.	Dr. A.K Barnwal	Member Internal
7.	Dr Harish chandra	Member Internal
8.	Sri Ravi Kumar Gupta	Member Internal
9.	Dr. Krishna Kumar	Member Internal
10.	Dr. Abhijit Mishra	Member Internal
11.	Dr. Abhishek Kr. Gupta	Member Internal
12.	Dr. Ram Keval	Member Internal
13.	Prof Sanjay Chaubey	Member External
14.	Prof G. Anantharaman	Member External

The Following decisions were taken

1. The list of Examiners for Theory & Practical Examination of Physics, Chemistry, Mathematics, & Humanities for ODD Semester 2017-18 sessions was prepared.
2. The revised syllabus of Engineering Physics BAS-02 and BAS-08 has been recommended, which will be effective from the session 2018-19.
3. The revised syllabus of Applied Engineering Chemistry BAS-15 has been recommended, which will be effective from the session 2018-19.
4. The recommendation of emergent BOS regarding the syllabus of Advanced Mathematics & Statistics BAS-31 effective from session 2017-18 has been confirmed.
5. The revised syllabus of Engineering Chemistry BAS-09 has been recommended, which will be effective from the session 2018-19.

The meeting ended with thanks to the chairman

Letter No.MUT/Appl. Sc./BOS/   /2017

Dated: Sept 23 , 2017

HASD 23-8-17

Copy forwarded for information & necessary action to:-
1. Dean UG&E

HASD 23-8-17

6

BAS-02 A

ENGINEERING PHYSICS-I

Course category	:	Basic Science and Math's (BSM)
Pre-requisites	:	NIL
Contact hours/week	:	Lecture : 3. Tutorial : 1 . Practical: 2
Number of Credits	:	5
Course Assessment methods	:	Continuous assessment through tutorials. assignments. quizzes and Three Minor tests and One Major Theory & Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Basics of relativity and its application in Engineering
2. Quantum Mechanics and its application to understand material properties
3. Statistical mechanics and its application in study of Macro and Micro scale properties of Matter.
4. Use of the principle of optics in the measurement.
5. Applications of Laser and holography in Engineering.
6. Basic principle of optical fiber and its applications.

Topics Covered	
UNIT-I	
Relativistic Mechanics	9
Relativistic Mechanics: Inertial and Non-inertial Frames of reference. Galilean transformation. Michelson-Morley Experiment. Postulates of special theory of relativity. Lorentz Transformation. Length contraction. Evidences of length contraction. Time dilation. Evidences for time dilation. Relativistic velocity transformation. Relativistic variation of mass with velocity. Relativistic kinetic energy. Mass energy equivalence. Examples from nuclear physics. Relativistic energy-momentum relation.	
UNIT-II	
Quantum Mechanics	9
De Broglie waves and Group velocity concept. Uncertainty principle and its application. Davisson-Germer experiment. Derivation of Schrodinger equation for time independent and time dependent cases. Postulates of quantum mechanics. Significance of wave function. Application of Schrodinger wave equation for a free particle (one dimensional and three dimensional case). Particle in a box (one dimensional). Simple harmonic oscillator (one dimensional).	
UNIT-III	
Physical Optics	9
Interference: Interference of light. Interference in thin films (parallel and wedge shaped film). Newton's rings, refractive index and wavelength determination. **Diffraction:** Single. double and N- Slit Diffraction. Diffraction grating. Grating spectra. dispersive power. Rayleigh's criterion and resolving power of grating.	

Polarization: Phenomena of double refraction. Nicol prism. Production and analysis of plane, circular and elliptical polarized light. Retardation Plate. Polarimeter

UNIT-IV

Modern Optics

Laser: Spontaneous and stimulated emission of radiation. population inversion. concept of 3 and 4 level Laser. construction and working of Ruby. He-Ne lasers and laser applications.

Fiber Optics: Fundamental ideas about optical fiber. Propagation mechanism. Acceptance angle and cone. Numerical aperture. Propagation Mechanism and communication in fiber Single and Multi Mode Fibers. step index and graded index fiber.

Holography: Basic Principle of Holography. Construction and reconstruction of Image on hologram and applications of holography.

EXPERIMENTS

1. To determine the wavelength of monochromatic light by Newton's Ring
2. To determine the specific rotation of cane sugar solution using polarimeter
3. To determine the wavelength of spectral lines using plane transmission grating.
4. To verify Brewster's law using rotating Nicol prism
5. To verify Stefan's law by electrical method
6. To Study resonance in LCR circuit with a c source.
7. To determine the height of a tower with a Sextant.
8. To determine the refractive index of a liquid by Newton's ring.

Textbooks

1. Introduction to Special theory Relativity-Robert Resnick. Wiley Eastern Ltd.
2. Quantum Mechanics: Theory and Applications- Ajoy Ghatak. Tata McGraw-Hill
3. Optics- N. Subrahmanyam. Brij Lal. M.N. Avadhanulu. S.Chand
4. Fiber optics and laser Principles and Applications-Anuradha De. New Age International

Reference books

1. Optics- Ajoy Ghatak. Tata McGraw-Hill
2. Concepts of Modern Physics-Arthur Beiser . Tata McGraw-Hill

BAS-08 A	ENGINEERING PHYSICS-II	
Course category	:	Basic Science and Math's (BSM)
Pre-requisites	:	NIL
Contact hours/week	:	Lecture : 3. Tutorial : 1 . Practical: 2
Number of Credits	:	5
Course Assessment methods	:	Continuous assessment through tutorials. assignments. quizzes. Minor test and Major Theory & Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge. skills and attitudes after completing this course

1. Basics of crystallography application in Engineering
2. Use of the principles of sound wave and acoustics in civil engineering with the consideration of NDT.
3. Basic principles of electricity and magnetism applied in Engineering.
4. Maxwell's equation of electromagnetic theory and its application in engineering.
5. Basic principles of semiconducting materials and its application.

Topics Covered	
UNIT-I	
Crystal Structures and X-ray Diffraction Space lattice. basis. Unit cell. Lattice parameter. Seven crystal systems and Fourteen Bravais lattices. Crystal-System Structure. Packing factor (cubic. body and face). Crystal structure of NaCl. Lattice planes and Miller Indices. Diffraction of X-rays by crystal. Laue's experiment. Bragg's Law. Bragg's spectrometer.	9
UNIT-II	
Sound Waves and Acoustics Sound waves. intensity. loudness. reflection of sound. echo: Reverberation. reverberation time. Sabine's formula. remedies over reverberation; Absorption of sound. absorbent materials; Conditions for good acoustics of a building: Noise. its effects and remedies: Ultrasonic –Production of ultrasonic by Piezo-electric and magnetostriction; Detection of ultrasonic; Engineering applications of Ultrasonic (Non-destructive testing).	9
UNIT-III	
Electrodynamics –I Basic concepts of Gauss's law. Ampere's law and faradays law of electromagnetic induction. Correction of Ampere's law by Maxwell (concept of displacement current). Maxwell's equation. transformation from integral form to differential form. physical significance of each equation **Electrodynamics –II** Maxwell's equation in free space. velocity of electromagnetic wave. transverse character of the wave and orthogonality of E. H and k vectors. Maxwell's equations in dielectric medium and velocity of e. m. wave. comparison with free space. Maxwell's equations in conducting media. solution of differential equation in this case and derivation of penetration depth	9

UNIT-IV

Physics of Advanced Materials

Semiconducting Materials: Concept of energy bands in solids, Carrier concentration and conductivity in intrinsic semiconductors and their temperature dependence, carrier concentration and conductivity in extrinsic semiconductors and their temperature dependence. Hall effect in semiconductors, Compound semiconductors, Optoelectronic Materials.

Superconducting Materials: Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, Type I and Type II superconductors, Electrodynamics of superconductors, BCS theory (Qualitative) and Applications of Superconductors.

Nano-Materials: Basic principle of nanoscience and technology, structure, properties and uses of Fullerene and Carbon nanotubes, Applications of nanotechnology.

EXPERIMENTS

1. To determine the specific resistance of a given wire using Carrey Foster's Bridge.
2. To study the variation of magnetic field along the axis of current carrying circular coil.
3. To study the Hall's effect and to determine Hall coefficient in n type Germanium.
4. To study the energy band gap of n- type Germanium using four probe method
5. To determine e/m of electron using Magnetron valve
6. To draw hysteresis curve of a given sample of ferromagnetic material
7. To determine the velocity of Ultrasonic waves
8. To determine the Elastic constants (Y, η, σ) by Searls method

Textbooks

1.	Solid State Physics - S. O. Pillai, 5 th edition, New Age International.
2.	Semiconductor Devices and Application - S.M. Sze, Wiley
3.	Introduction to Nano Technology - Poole Owens, Wiley India
4.	Master Hand book of Acoustics - F. Alton Everest and Ken Pohlmann, 5 th edition, McGraw Hill

Reference books

1.	Introduction to Solid State Physics- Kittel , 7 th edition, Wiley Eastern Ltd.
2.	Introduction to Electrodynamics- David J. Griffiths Pearson, New International Edition

BAS-09		ENGINEERING CHEMISTRY
Course category	:	Basic Sciences & Maths (BSM)
Pre-requisites	:	NIL
Contact hours/week	:	Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits	:	5
Course Assessment methods	:	Continuous assessment through tutorials, assignments, quizzes, Minor test and Major Theory & Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Students will acquire basic knowledge in Engineering Chemistry, which allows students to gain qualitative and quantitative skills.
2. Make good scientific observations and develop experimental method of evaluation of different systems at industrial or research level.
3. Students will develop Interdisciplinary skills which can help them to thrive in the life-long changing environment in various fields of Industry.
4. Students will acquire practical knowledge and will be able to analyse data constructively and formulate new ideas.

UNIT-I	9
Molecular orbital theory, LCAO approximation, MO diagrams of diatomic molecules. Band theory of metallic bond, Hydrogen bonding, Structure of graphite and fullerene- C_{60}. Liquid crystallite state, classification and applications of liquid crystals. Phase Rule and its application to water system.	

UNIT-II	9
Inductive, mesomeric and hyperconjugative effects, Stability of reactive intermediates, e.g. Carbocation, Carbanion and free radicals. Types of organic reactions, & Mechanism of nucleophilic substitution & elimination reactions, Mechanism of organic name reactions (Cannizzaro reaction, Aldol condensation, Beckmann rearrangement, Hoffmann rearrangement & Diels Alder Reaction) Stereosomerism of organic compounds containing one & two chiral centers. Enantiomers & diastereomers, R-S & E-Z Nomenclature. Examples of optically active compounds without chiral centre, Conformations of butane.	

UNIT-III	9
Introduction & classification of polymers, Chain and Step growth polymerization, Thermoplastic and Thermosetting resins, Elastomers and synthetic fibres, Mechanism of chain polymerization, Stereoregular polymers, Synthesis and applications of: Polyethylene, Poly propylene, PVC, PMMA, PAN, PET, Polyamides, Polyurethane, Natural and synthetic Rubbers, Phenol Formaldehyde Resin. Conducting & biodegradable polymers and their applications Classification of Fuels, calorific value of fuel, gross & net calorific value, determination of calorific value using Bomb calorimeter	

UNIT-IV	9
Basic principles of spectroscopic methods, Basic principles of UV-Visible, IR, ^{1}H NMR & Mass spectroscopy, determination of structure of simple organic compounds. Hardness of water, Softening of water (Zeolite process, Lime Soda process & Ion exchange process). Treatment of boiler feed water by Calgon process	

EXPERIMENTS

1. Determination of iron content in the given sample using $K_3[Fe(CN)_6]$ as an external indicator.
2. Determination of temporary and permanent hardness in water sample using EDTA as standard solution.

3. Determination of alkalinity in the given water sample.
4. Determination of chloride content in the given water sample by Mohr's method.
5. Determination of percentage of available chlorine in bleaching powder sample.
6. pH-metric titration between strong acid and strong base.
7. Viscosity of a polymer like polystyrene by Viscometric method.
8. Element detection & functional group identification in organic compounds
9. Preparation of a polymer like Bakelite or PMMA.
10. Preparation of Sodium Cobaltinitrite salt.

Books & References

1. Engineering Chemistry, Wiley India
2. Engineering Chemistry, Tata McGraw Hill
3. Concise Inorganic Chemistry - J.D. Lee; Wiley India
4. Organic Chemistry- Morrison & Boyd, 6th edition, Pearson Education
5. Physical Chemistry - Gordon M. Barrow; McGraw Hill
6. Physical Chemistry - Peter Atkins & Julio De Paula, Oxford University Press

BAS-15	APPLIED ENGINEERING CHEMISTRY
Course category	: Basic Sciences & Maths (BSM)
Pre-requisites	: NIL
Contact hours/week	: Lecture: 3, Tutorial: 1, Practical: 2
Number of Credits	: 5
Course Assessment methods	: Continuous assessment through tutorials, assignments, quizzes, Minor test and Major Theory & Practical Examination
Course Outcomes	: The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Students will acquire basic knowledge in Engineering Chemistry, which allows students to gain qualitative and quantitative skills.
2. Make good scientific observations and develop experimental method of evaluation of different systems at industrial or research level.
3. Students will develop Interdisciplinary skills which can help them to thrive in the lifelong changing environment in various fields of Industry.
4. Students will acquire practical knowledge and will be able to analyze data constructively and formulate new ideas.

UNIT-I

Thermodynamics I: First Law of thermodynamics and internal energy, state and state functions, sign convention for heat and work, nature of work, path dependence of heat and work. Enthalpy, heat changes at constant volume and constant pressure, heat capacities (CV, CP) and their relationship for ideal gases. Change in internal energy (ΔU) and enthalpy (ΔH) of chemical reactions, relation between ΔU and ΔH. | 9

Thermodynamics II: Second Law of Thermodynamics, Carnot cycle, entropy, entropy changes in reversible and irreversible processes and of universe.

Electrochemistry: Arrhenius theory of electrolytic dissociation, Hydrolysis of salts, hydrolysis constant, buffer solutions.

UNIT-II

Electrochemical Cells: Reactions in reversible cells, free energy and emf of reversible cell. Single electrode potential (Nernst equation), its measurement and sign convention. Standard electrode potential. Emf of reversible cell from electrode potentials. Types of reversible electrode, reference electrodes. Applications of emf measurements. | 9

Corrosion: Causes of metallic corrosion, Electrochemical theory of corrosion, types of corrosion, prevention of corrosion (electrochemical and inhibitor method).

Chemical Kinetics: Order and molecularity of chemical reactions, first order and pseudo first order reactions. Kinetic law for second order reactions, determination of the rate constant and order of reaction from kinetic data. Effect of temperature on rate of reaction, Arrheninus equation.

UNIT-III

Basic concepts of organic reactions. Types of organic reactions (Addition, substitution, elimination and rearrangement reactions) | 9

Electrophilic Substitution, Mechanism of nitration, halogenation, sulphonation, and Friedel-Crafts (alkylation and acylation) reactions. Effects of substituents on orientation and reactivity.

Addition reactions , Hydration, and hydroxylation reactions.

UNIT-IV	9

Coordination compounds: Nomenclature, Werner's theory. Isomerism. Sidgwick's EAN concept and Valence Bond Theory.

Theories of Metal-Ligand bonding: Limitations of valence bond theory; Crystal-field theory and crystal-field splitting in octahedral, tetrahedral and square planar complexes. Factors affecting the crystal-field splitting.

EXPERIMENTS

1. Determination of the coefficient of viscosity of the given unknown liquids using Viscometer and identify the given liquid.
2. Study of the distribution of iodine between water and $CHCl_3$ / butanol.
3. Determination of the specific reaction rate of the hydrolysis of methyl acetate/ethyl acetate catalyzed by hydrogen ions at room temperature.
4. Determination of the strength of NaOH solution with the help of oxalic acid.
5. Preparation of inorganic complex of copper/ nickel.
6. Preparation of polyacrylic acid by free radical polymerization.
7. Determination of the strength of ferrous ammonium sulphate using $KMnO_4$ as self indicator.
8. Determination of Surface Tension of a given liquid by Stalagamometer.
9. Preparation of iodoform from acetone.
10. Applications of TLC in the organic chemistry.
11. Element detection & functional group identification in organic compounds

Textbooks & Reference books

1. *Engineering Chemistry*, Wiley India
2. *Engineering chemistry* by Sivasankar, Tata McGraw Hill, New Delhi.
3. *Physical Chemistry*, P. C. Rakshit, 5th Edition (1988), 4th Reprint (1997), Sarat Book House, Calcutta.
4. *Physical Chemistry* by Peter Atkins & Julio De Paula; Oxford University Press
5. *Physical Chemistry*, K. J. Laidler and J. M. Meiser, 3rd Edition, Houghton Mifflin Comp., New York, International Edition (1999).
6. *Inorganic Chemistry*, J.E. Huheey, E.A. Keiter and R.L. Keiter, Pearson Education India, 2006.
7. *Concise Inorganic Chemistry* by J.D. Lee; Wiley India
8. *Guidebook to Mechanism in Organic Chemistry* by Peter Sykes, Orient Longman
9. *Organic Chemistry* by Morrison & Boyd; Pearson Education
10. *Organic Chemistry*, J. Clayden, N. Greeves, S. Warren, and E. Wothers, Oxford Univ. Press, Oxford (2001).

BAS 31	Advanced Mathematics and Statistics

Course category	:	Basic Sciences & Maths (BSM)
Pre-requisites	:	NIL
Contact hours/week	:	Lecture : 3, Tutorial : 1
Number of Credits	:	4
Course Assessment methods	:	Continuous assessment through tutorials, assignments, quizzes,Minor tests and One Major Theory Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. To find the root of a curve using Bisection, Regula Falsi, Newton's Methods.
2. Use of moments and kurtosis to find the type of curve.
3. To interpolate a curve using interpolation formula.
4. Use of Fourier transforms and Z transforms to solve the differential equation.

Topics Covered

UNIT-I	
Numerical Methods I: Solution of algebraic and transcendental equations by Bisection, Regula-Falsi, secant Method and Newton-Raphson methods. Newton's Gregory forward and backward interpolation, Lagrange's and Newton's divided difference method.	9
UNIT-II	
Numerical Methods II: Solution of system of linear equations by Jacobi, Guass-Siedel method and Crout's method. Trapezoidal Rule, Simpson's one-third and three-eight rules. Solution of differential equations by Taylor, Picard, Euler, Runge-Kutta Fourth Order Methods, Milne's and Adam's predictor and corrector methods.	9
UNIT-III	
Integral Transforms: Fourier integral, Complex Fourier transform, Inverse Transforms, Convolution theorem, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equation, wave equation. Z- transform and its application to solve difference equations	9
UNIT-IV	
Statistical Methods and Probability Distributions: Frequency Distributions, mean, mode, median, standard deviation, Moments, Skewness, Kurtosis, Types and measurement of Skewness and Kurtosis. Correlation; Regression and regression lines. Binomial Distribution, Poisson's Distribution, Normal Distribution.	9

Textbooks

1.	B.S. Grewal: Higher Engineering Mathematics; Khanna Publishers.
2.	B.V. Ramana: Higher Engineering Mathematics, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi.

Reference books

1.	Numerical Methods: P.Kandasamy, K.Thilagavathi, K.Gunavathi., S. Chand & Company.
2.	N.P. Bali and Manish Goel: Engineering Mathematics; Laxmi Publications.
3.	Beri - Business Statistics (Tata Mc. Graw Hill 2nd edition).