2018.1.12 शैक्षिक सत्र 2017-18 के इवेन सेमेस्टर के समस्त <u>B.Tech.</u> 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।

MADAN MOHAN MALAVIYA UNIVERSITY OF
TECHNOLOGY,
GORAKHPUR – 273 010 (UP) INDIA.
(formerly M. M. M. Engineering College, Gorakhpur)

ELECTRICAL ENGINEERING DEPARTMENT

Minutes of Meeting of Members of Board of Studies (BOS) held on 27.01.2018 at 11.00 A.M. in the Office of Head, Electrical Engineering Department

Following members were present:

1.	Prof. S.K. Srivastava	Chairman
2.	Prof. K. G. Upadhyay	Internal Member
3.	Sri K.P. Singh	Internal Member
4.	Prof. A.K. Pandey	Internal Member
5.	Prof. A.N Tiwari	Internal Member
6.	Dr. Prabhakar Tiwari	Internal Member
7.	Dr. L.B. Prasad	Internal Member
8.	Dr. Awadhesh Kumar	Internal Member
9.	Dr. Navdeep Singh	Internal Member
10.	Sri Shekhar Yadav	Internal Member
11.	Prof. K. S. Verma	External Member
12.	Er. Ajay Kumar	External Member

Dr. G.K. Singh (External Member), Er. Himanshu Sharma (External Member) and Sri K. B. Sahay (Internal member) could not attend the meeting.

The following decisions have been taken:

1. Panel of Examiners for theory and practical examinations (Internal/External) of UG & PG program (Even Sem) & Comprehensive Exam of Ph.D scholars for 2017-18 have been discussed and finalized.

2. The Syllabi of B. Tech. courses BEE-14, BEE-15 and BEE-20 were discussed and modified with proper justification. Existing and modified syllabi is attached herewith.

3. The syllabus of M. Tech. course MEE-104 was discussed and modified. The same is attached herewith.

4. In the ordinances, curricula and syllabi for undergraduate Programme for newly admitted students from session 2014-15 in the page no.419, for Senior year, semester VIII, category DC, paper code BEE-44, subject Utilization & Traction (L. T. P= 3, 1, 2) has been given 5 credit courses (Photocopy attached), but it is actually 4 credit course. The detail of the subject Utilization & Traction, paper code BEE-44 is mentioned of 4 credits in Engineering Fundamentals & Departmental core (Electrical Engg.) for year IV at page no. 50 (Photocopy attached) at the page no. 319, where the syllabus of Utilization & Traction is given, that is also of 4 credit course (Photocopy attached). So, the above subject of paper code BEE-44 should be modified as a 4-credit course, instead of 5 credit course.

Meeting ended with Vote of thanks to the Chair.

(Shekhar Yadava)   (Sandeep Singh)   (Awadhesh Kumar)

(A. K. Pandey)   (A. N. Tiwari)   (Prabhakar Tiwari)   (L. B. Prasad)

(K. P Singh)   (K.G.Upadhyay)   (Ajay Kumar)   (K.S Verma)

(S.K. Srivastava)

Junior Year, Semester-VI

S.N.	Category	Paper Code	Subject	L	T	P	Credits
1.	DC	BEE-29	Instrumentation & Process Control	3	1	2	5
2.	DC	BEE-31	Power System- II	3	1	2	5
3.	DC	BEE-32	Power Electronics	3	1	2	5
4.	DC	BEE-33	Power Plant Engineering	3	1	0	4
5.	PE2	BEE-**	Programme Elective-2	3	1	0/2	4/5
6.	AC	BEE-30	Seminar	0	0	6	-
			Total	15	5	6/8	23/24

Senior Year, Semester-VII

S.N.	Category	Paper Code	Subject	L	T	P	Credits
1.	DC	BEE-41	Electric Drives	3	1	2	5
2.	DC	BEE-42	Switch Gear & Protection	3	1	2	5
3.	DC	BEE-43	Power System Operation and Control	3	1	0	4
4.	PE3	BEE-**	Programme Elective-3	3	1	0/2	4/5
5.	P	BEE-40	Project Part I	0	0	10	5
6.	AC	BEE-45	Industrial/Practical Training	0	0	2	-
			Total	12	4	14/16	23/24

Senior Year, Semester-VIII

S.N.	Category	Paper Code	Subject	L	T	P	Credits
1.	DC	BEE-44	Utilization & Traction	3	1	2	5
2.	DC	BEE-46	Power Quality	3	1	0	4
3.	PE4	BEE-**	Programme Elective-4	3	1	0	4
4.	OE	BOE**	Open Elective	3	1	0	4
5.	P	BEE-50	Project Part- II	0	0	10	5
			Total	12	4	12	22

Engineering Fundamentals & Department Core (Electrical Engineering)

S.N.	Paper Code	Subject	Prerequisite Subjects	L	T	P	Credits
		Year I					
1.	BEE-02	Electrical Circuits and Analysis	-	3	1	2	5
		Year II					
2.	BEE-11	Basic System Analysis	-	3	1	0	4
3.	BEE-12	Electrical Measurement & Measuring Instruments	-	3	1	2	5
4.	BEE-13	Electromechanical Energy Conversion-1	-	3	1	2	5
5.	BEE-14	Network Analysis and Synthesis	-	3	1	2	5

S.N.	Paper Code	Subject	Prerequisite Subject	L	T	P	Credits
6.	BEE-15	Introduction to Microprocessors	-	3	1	2	5
7.	BEE-20	Simulation Techniques	-	0	0	4	2
		Year III					
8.	BEE-26	Electromechanical Energy Conversion-II	-	3	1	2	5
9.	BEE-27	Power System- I	-	3	1	0	4
10.	BEE-28	Control System Engineering	-	3	1	2	5
11.	BEE-29	Instrumentation & Process Control	-	3	1	2	5
12.	BEE-31	Power System- II	-	3	1	2	5
13.	BEE-32	Power Electronics	-	3	1	2	5
14.	BEE-33	Power Plant Engineering	-	3	1	0	4
15.	BEE-30	Seminar	-	0	0	6	3
		Year IV					
16.	BEE-41	Electric Drives	BEE-32	3	1	2	5
17.	BEE-42	Switch Gear & Protection	-	3	1	2	5
18.	BEE-43	Power System Operation and Control	-	3	1	0	4
19.	BEE-44	Utilization & Traction	-	3	1	0	4
20.	BEE-46	Power Quality	-	3	1	0	4
21.	BEE-40	Project Part-I	-	0	0	10	5
22.	BEE-45	Industrial Practical Training	-	0	0	2	1
23.	BEE-50	Project Part-II	BEE-40	0	0	10	5

Programme Electives (Electrical Engineering)

S.N.	Paper Code	Subject	Prerequisite Subject	L	T	P	Credits
		PE1 for V Semester					
1.	BCS-36	Database Management System, Data Mining and Warehousing	-	3	1	0	4
2.							
3.							
4.	BEC-14	Electromagnetic Field Theory	-	3	1	0	4
		PE2 for VI Semester					
5.	BEE-51	High Voltage Engineering	-	3	1	0	4
6.	BEE-52	Intelligent Instrumentation	BEE-29	3	1	0	4
7.	BEE-53	Digital Control System	-	3	1	0	4
8.	BEE-54	Conventional and CAD of Electrical Machines	-	3	1	2	5
		PE3 for VII Semester					
9.	BCS-13	Object Oriented Techniques and JAWA Programming	-	3	1	0	4
10.	BEC-28	Principle of Communication	-	3	1	2	5
11.	BEE-55	EHV AC & DC Transmission	-	3	1	0	4
12.	BEE-56	Advanced Microprocessors and Micro	BEE-15	3	1	2	5

AC Transmission Systems"
4. J. Wood & B.F. Wollenburg. "Power Generation, Operation and Control "John Wiley Sons.

References
1. O.I. Elgerd. "Electric Energy System Theory" Tata McGraw Hill.
2. P. Kundur. "Power System Stability and Control McGraw Hill.
3. M.H. Rashid. "Power Electronics: Circuits, devices and Applications" Prentice Hall of India, 3rd Edition.
4. T. K. Nagsarkar & M.S. Sukhiza.` Power System Analysis' Oxford University Press

BEE-44   UTILIZATION AND TRACTION

Course category	: Department Core (DC)
Pre-requisite Subject	: NIL.
Contact hours/week	: Lecture : 3, Tutorial : 1 , Practical: 0
Number of Credits	: 4
Course Assessment methods	: Continuous assessment through tutorials, attendance, home assignments, quizzes and Three 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. Advantages and methods of electrical heating, concept of resistance heating, electrical arc heating, induction heating and dielectric heating

2. Knowledge of electric arc welding, resistance welding and electronic welding control, laws of electrolysis, concept of electro deposition and application of electrolysis

3. Laws of illumination, requirement of good lighting, design of indoor and outdoor lighting , concept of refrigeration and air condoning systems ,domestic refrigerator and water cooler, concept of window air conditioner

4. Knowledge of types of electric traction, system of electrification, traction mechanism ,speed time curve specific energy consumption mechanism of train movement, coefficient of adhesion and its influence

5. Salient features of traction drives, series parallel control of traction drives and energy saving, power electronic control dc and ac traction drives, diesel electric traction

Topics Covered
UNIT-1
Electric Heating: 9
Advantages and methods of electric heating, Resistance heating, Electric arc heating, Induction

BEE-15 Microprocessor: Architecture, Programming and Interfacing

Course category : Department Core (DC)
Pre-requisite Subject : BEC-12 Digital Electronics & Circuits
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 Learning Objective	Course Outcomes
This subject helps student to learn the	The students should be able to use and apply
• Microcomputer systems and its associated hardware	• The hardware knowledge of 8085 microprocessor
• Detailed architecture of the Intel 8085 microprocessor.	• The programming skill on 8085 microprocessor based applications along with peripheral interfaces
• Operation and control, instruction set and interrupts of the microprocessor	• The knowledge on Intel 8086 microprocessor architecture and operation.
• Assembly language programming with the 8085 microprocessor	
• Intel 8255 and 8254 peripheral interfaces	
• Architecture and operation of the Intel 8086 microprocessor	

Unit-I

Introduction to Microcomputer Systems and Hardware: History of Computers, Computer Languages, Large computers to Single-Chip-Microcomputers, Evolution of Microprocessors, Microprocessor Architecture and Its operations, memory, Input/Output, Interfacing Devices.

8085 Microprocessor: Pin configuration, internal architecture, control and status signals, interrupts, bus timings, de-multiplexing of address bus, generating control signals, ALU, Flag register.

Unit-II

Operation and Control of Microprocessor: Decoding and executing an instruction, op-code fetch machine cycle, memory read/write machine cycles, I/O read/write machine cycles, interrupt acknowledge machine cycle, state-transition diagram.

Instruction Set: Addressing modes: Data transfer, arithmetic, logical, branch, stack and machine control groups of instruction set, macro RTL and micro RTL, flow chart of few typical instructions, unspecified flags and instructions.

Interrupts: Interrupt structure of 8085 microprocessor, processing of vectored and non-vectored

Unit-III

Assembly Language Programming for 8085 microprocessor: Assembler directives, simple examples; Subroutines, parameter passing to subroutines, programming techniques with looping, counting and indexing, counter and timing delays.

Serial and Parallel Input and Output: memory mapped I/O, I/O mapped I/O, Programmed I/O, Interrupt Driven I/O, DMA I/O.

Programmable Peripheral Interface: Intel 8255, pin configuration, internal structure of a port bit, modes of operation, bit SET/RESET feature.

Programmable Interval Timer: Intel 8253, pin configuration, internal block diagram of counter and modes of operation, counter read methods.

Unit-IV

16-bit Microprocessor: Architecture of Intel 8086 (Bus Interface Unit, Execution Unit), register organization, memory addressing, memory segmentation, operating modes, addressing modes, instruction set, hardware and software interrupts, responses and types.

Experiments

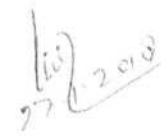| Course Learning Objective	Course Outcomes
This subject helps student to learn the	The students should be able to use and apply
• To become familiar with 8085 microprocessor training kit.	• The Intel 8085 based microcomputer training kits/Software Simulator.
• To be able to write Intel 8085 microprocessor based assembly language program.	• The knowledge of the 8085 microprocessor to write typical assembly language programs
• To become familiar with 8085 microprocessor software simulator.	• The programming to the peripheral devices interfaced with the Intel 8085 based microcomputer.

Perform at least any ten experiments from the following:

1. To become familiar with 8085 microprocessor training kit/Software Simulator and execute following programs.

   • Add two 8 bit numbers stored in register B & C store result in register D.

   • Subtract 8 bit data stored at memory location 4021h from data stored at memory location 4020h. Store result at memory location 4022h.

   • To perform OR operation between accumulator and register B. Store result in register C.

2. To become familiar with 8085 microprocessor simulator and simulate following programs using simulator

   • Write a program to interchange content of register B and C

   • Subtract content of register E from register B.

   • Complement content of accumulator and display result on output port PORT2.

   • Perform logical AND operation between accumulator and register B and C. Logical AND operation between

3. Write a program to transfer set of data from memory location 2050-205Fh to 2060-206Fh

4. Write a program to find smallest number from given set of data stored at location 2040h to 205Fh

5. Write a program to find negative numbers in given set of data stored at the location 2050h to 205Fh

6. Write program to arrange an array of data in ascending order

7. Write a program to multiply two 8 bit numbers stored at the location 2100 and 2101. Store result at memory location 2102h

8. Write program to divide 16 bit number stored at memory location 2100h and 2101h by 8 bit number stored at memory location 2102h. Store the quotient in memory locations 2110h and 2111h, remainder at memory location 2112h.

9. Write a program to convert hexadecimal number into equivalent BCD number

10. Write a program to check parity of data stored at memory location 2100. Move content EEh to register B, if parity is even and 00h if parity is Odd.

11. To interface Programmable peripheral interface (PPI) IC-8255 with 8085 Microprocessor in Mode 0.

12. To generate square wave on port pin PC7 of 8255 in BSR mode.

Justifications:

1. The modification in the syllabus has been done to more focus on the questions asked in GATE, IES and Civil Services exams.

2. Intel 8085 Microprocessor based (Assembly Language) programming has been given more stress.

3. Interfacing and programming of peripheral devices with the microprocessor has been included in detail in order to orient student's learning for applications of Microprocessors.

5. Verification of Reciprocity Theorem.
6. Star Delta Transformation
7. Power Factor Improvement
8. To plot frequency response of a series resonant circuit.
9. To plot frequency response of a parallel resonant circuit.
10. To measure input impedance and output impedance of a given two port network.
11. To design a Π attenuator which attenuate given signal to the desired level.

Text Books
1. M.E. Van Valkenburg, "Network Analysis", Prentice Hall of India
2. A. Chakrabarti, "Circuit Theory" Dhanpat Rai & Co.
3. C.L. Wadhwa, "Network Analysis and Synthesis" New Age International Publishers, 2007
4. D. Roy Choudhary, "Networks and Systems" Wiley Eastern Ltd.
5. Donald E. Scott: "An Introduction to Circuit analysis: A System Approach" McGraw Hill

References
1. M.E. Van Valkenburg, "An Introduction to Modern Network Synthesis". Wiley Eastern Ltd.
2. N.C. Jagan and C. Lakshminarayana, "Network Analysis" B.S. Publications, 2008.
3. K.S. Suresh Kumar, "Electric Circuits and Networks" Pearson Education. 2009.
4. A Ramakalyan, "Linear Circuits: Analysis and Synthesis" Oxford University Press, 2005.

BEE-15   INTRODUCTION TO MICROPROCESSORS

Course category	:	Department Core (DC)
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 the course

1. Acquire the introductory knowledge of Digital Computer, microprocessor internal architecture and microprocessor development system.

2. Student gains knowledge on Intel 8085 microprocessor detailed internal architecture along with its assembly language programming.

3. Student gains knowledge on Intel 8086 microprocessor detailed internal architecture, instruction set and interrupts.

4. Student gains knowledge on DMA controller, programmed I/O, interrupt controller and programmable timer/counter interface of Intel's 8-bit and 16-bit microprocessors.

5. With the above knowledge the students will be able to understand advanced microprocessors and microcontroller systems

Topics Covered
UNIT-I
Introduction to Digital Computer and Microprocessor 9
Digital Computers: General architecture and brief description of elements, instruction execution, instruction format, and instruction set, addressing modes, programming system, higher lever languages.
Buses and CPU Timings: Bus size and signals, machine cycle timing diagram, instruction timing, processor timing.
Microprocessor and Microprocessor Development Systems: Evolution of Microprocessor, Microprocessor architecture and its operations, memory, inputs-outputs (I/Os), data transfer schemes interfacing devices, architecture advancements of microprocessors, typical microprocessor development system.

UNIT-II
8-bit Microprocessors 9
8085 microprocessor: pin configuration, internal architecture. Timing & Signals: control and status, interrupt: ALU, machine cycles,
Addressing Modes: Register addressing, direct addressing; register indirect addressing, immediate addressing, and implicit addressing.
Instruction format, op-codes, mnemonics, no. of bytes, RTL, variants, no. of machine cycles and T states, addressing modes.
Instruction Classification: Data transfer, arithmetic operations, logical operations, branching operation, machine control; Writing assembly Language programs, Assembler directives.

UNIT-III
16-bit Microprocessors 9
Architecture: Architecture of INTEL 8086 (Bus Interface Unit, Execution unit), register organization, memory addressing, memory segmentation, Operating Modes.
Instruction Set of 8086
Addressing Modes: Instruction format: Discussion on instruction Set: Groups: data transfer, arithmetic, logic string, branch control transfer, processor control.
Interrupts: Hardware and software interrupts, responses and types.

UNIT-IV
Peripheral Interfacing 9
I/O programming: Programmed I/O, Interrupt Driven I/O. DMA I/O interface: serial and parallel communication, memory I/O mapped I/Os. Peripheral Devices: 8237 DMA controller, 8255-Programmable peripheral interface, 8253/8254 Programmable timer/counter. 8259 programmable Interrupt Controller.

EXPERIMENTS

1. To become familiar with 8085 microprocessor training kit and execute following programs microprocessor kit.
   - Add two 8 bit numbers stored in register B & C store result in register D.
   - Subtract 8 bit data stored at memory location 4021h from data stored at memory location 4020h. Store result at memory location 4022h.
   - To perform OR operation between accumulator and register B. Store result in register C.

2. To become familiar with 8085 microprocessor simulator and simulate following programs using simulator
   - Write a program to interchange content of register B and C
   - Subtract content of register E from register B.
   - Complement content of accumulator and display result on output port PORT2.
   - Perform logical OR operation between register B and C, logical AND operation between accumulator and register B.

3. Write a program to transfer set of data from memory location 2050-205Fh to 2060-206Fh

4. Write a program to find smallest number from given set of data stored at location 2040h to 205Fh

5. Write a program to find negative numbers in given set of data stored at the location 2050h to 205Fh

6. Write program to arrange an array of data in ascending order

7. Write a program to multiply two 8 bit numbers stored at the location 2100 and 2101. Store result at memory location 2102h

8. Write program to divide 16 bit number stored at memory location 2100h and 2101h by 8 bit number stored at memory location 2102h. Store quotient in memory locations 2110h and 2111h, remainder at memory location 2112h.

9. Write a program to separate out (unpack) two digit BCD number and pack (combine) two digit BCD number into one.

10. Write a program to convert hexadecimal number into equivalent BCD number

11. Write a program to check parity of data stored at memory location 2100. Move content EEh to register B, if parity is even and 00h if parity is Odd.

12. Write and execute program to display count value 0 to 9 on the seven segment display using standard subroutine for display output.

13. Write program to use vector interrupt (VI) RST 7.5 to switch from up counter to down counter.

14. Write program to flash message "EC LAB" on address and data field of display.

15. To interface Programmable peripheral interface (PPI) IC-8255 with 8085 Microprocessor in Mode 0.

16. To generate square wave on port pin PC7 of 8255 in BSR mode.

Text Books

1. Gaonkar, Ramesh S, "Microprocessor Architecture, programming and applications with the 8085" Pen ram International Publishing 5th Ed.

2. Uffenbeck, John, "Microcomputers and Microprocessors" PHI/ 3rd Edition.

3. Ray, A.K. & Burchandi, K.M., "Advanced Microprocessors and Peripherals: Architecture, Programaming and Interfacing" Tata McGraw Hill.

4. Krishna Kant, "Microprocessors and Microcontrollers" PHI Learning.

References

1. Brey. Barry B. "INTEL Microprocessors" Prentice Hall (India)
2. Aditya P. Mathur, "Introduction to Microprocessor" Tata McGraw Hill
3. M. Rafiquzzaman, "Microprocessors- Theory and applications" PHI
4. B. Ram, "Advanced Microprocessor & Interfacing" Tata McGraw Hill
5. Renu Singh & B.P.Singh. "Microprocessor and Interfacing and applications" New Age International
6. Hall D.V., "Microprocessors Interfacing" Tata McGraw Hill
7. Liu and Gibson G.A., "Microcomputer Systems: The 8086/8088 Family" Prentice Hall (India)

BEE-16   ELECTROMECHANICAL ENRGY CONVERSION

Course category	:	For other Departments
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. The concepts DC machines with numerical calculation.

2. The concept of transformer with numerical calculation.

3. The concept of synchronous machine & IM with numerical calculation.

Topics Covered

UNIT-I

DC Machines   9

Construction of DC Machines, Armature winding, EMF and torque equation, Armature Reaction, Commutation, Interpoles and Compensating Windings, Performance Characteristics of D.C. generators, Performance Characteristics of D.C. motors, Starting of D.C. motors ; 3point and 4 point starters, Speed control of D.C. motors: Field Control , armature control and Voltage Control (Ward Lenonard method); Efficiency and Testing of D.C. machines (Hopkinson's and Swinburn's Test).

UNIT-II

Transformers   9

Principle of operation, Construction, Phasor diagram, efficiency and voltage regulation of 1-phase transformer, O.C. and S.C. tests, Sumpner's test, polarity test. Single phase and three phase auto transformers, volt-amp, relation, efficiency, merits & demerits and applications, three phase to 2 phase, 6 phase or 12 phase connections, and their applications.

BEE20:SIMULATION TECHNIQUES LAB

COUSRE LEARNING OUTCOMES

The students will be able to

1. Gain knowledge on MATALAB desktop and its basic functions.
2. Acquire the knowledge of application of numerical technique in MATALAB functions.
3. Develop the MATALAB programming skill.
4. Solve simultaneous linear equations, differential equations etc., applied in the electrical circuit solutions.
5. Develop and verify the concepts of various complex electrical engineering problems.

LIST OF EXPERIMENTS

1. Study of basic matrix operations.
2. Solution of linear equations for under damped and over damped cases.
3. Determination of eigen values and eigenvectors of a square matrix.
4. Determination of roots of a polynomial.
5. Determination of polynomial using method of least square curve fitting.
6. Solution of differential equations using 4th order Runge-Kutta method.
7. Solution of differential equations using revised Euler method.
8. Determination of polynomial fit, analyzing residuals, exponential fit and error bounds from the given data.
9. Solution of ordinary differential equations (ODE).
10. Determination of time response of an R-L-C circuit.
11. Plotting of 2D and 3D curves.
12. Differentiation and Integration of a given function.

Note: *Subject Teacher may add more experiments in the above list.*

Reference Books:

1. Almos Gilat, "MATLAB: An Introduction with Applications" Wiley India Ltd., 2004.
2. R.P. Singh, "Getting Started with MATLAB" Oxford University Press.

Justifications:

1. Modification in the syllabus has been done to orient students' learning to solve complex problems in Electrical Engineering.
2. Students will be able to learn MATLAB functions applicable to Electrical Engineering.

5. Irving L. Kosow "Electric Machine and Transformers", Prentice Hall of India.
6. M.G. Say, "The Performance and Design of AC machines", Pit man & Sons.
7. Bhag S. Guru and Huseyin R. Hızırogulu, "Electric Machinery and Transformers" Oxford University Press, 2001.
8. P.S. Bimbhra, "Electrical Machinery", Khanna Publisher
9. P.S. Bimbhra, "Generalized Theory of Electrical Machines", Khanna Publishers

BEE-20   SIMULATION TECHNIQUES

Course category	:	Department Core (DC)
Pre-requisites Subject	:	NIL
Contact hours/week	:	Lecture : 0, Tutorial : 0 , Practical: 4
Number of Credits	:	2
Course Assessment methods	:	Continuous assessment through three Viva voce, Practical work/record, attendance and Major Practical Examination
Course Outcomes	:	The students are expected to be able to demonstrate the following knowledge, skills and attitudes after completing this course

1. Student gains knowledge on MATALAB desktop and its basic functions.

2. Acquire the knowledge of application of numerical technique in MATALAB functions.

3. Students develop the MATALAB programming skill.

4. With the above knowledge/skill students will be able to solve simultaneous linear equations, differential equations etc., applied in the electrical circuit solutions.

5. Learning of MATALAB Toolboxes helps the students able to develop and verify the concepts of various complex electrical engineering problems.

EXPERIMENTS

Note: Minimum SEVEN experiments are to be carried out

MATLAB Based Experiments

1. Solution of linear equations for under damped and over damped cases.
2. Determination of eigen values and eigenvectors of a square matrix.
3. Determination of roots of a polynomial.
4. Determination of polynomial using method of least square curve fitting.
5. Determination of polynomial fit, analyzing residuals, exponential fit and error bounds from the given data.
6. Solution of differential equations using 4th order Runge-Kutta method.
7. Solution of differential equation using revised Euler method.
8. Solution of difference equations.
9. Determination of time response of an R-L-C circuit.
10. College may add any three experiments in the above list.

Books & References
1. Almos Gilat, "MATLAB: An Introduction with Applications" Wiley India Ltd., 2
2. R.P. Singh, "Getting Started with MATLAB" Oxford University Press.

BEE-26   ELECTRO-MECHANICAL ENERGY CONVERSION –

Course category	:	Department Core (DC)
Pre-requisite Subject	:	NIL
Contact hours/week	:	Lecture : 3, Tutorial : 1 , Practical: 2
Number of Credits	:	5
Course Assessment methods	:	Continuous assessment through tutorials, atten assignments, quizzes, practical work, record, vi Three Minor tests and One Major Theory Examination
Course Outcomes	:	The students are expected to be able to den following knowledge, skills and attitudes after con course

1. Ability to learn basic concept of design, working & performances of th: Machines (Generator & Motor).

2. Ability to solve theoretical & numerical problems related with three Machines (Generator & Motor).

3. Ability to know constructional details, working principle & Performanc Phase AC Machines.

4. Ability to understand working, characteristics & applications of Spec Machines (Universal Motor, AC series motor, Hysteresis Motor, Reluctan

Topics Covered
UNIT-I
Synchronous Machine I:
Constructional features, types and working of AC generator, EMF Equation, Armatur O. C. & S. C. tests, Voltage Regulation and calculations of voltage regulation b methods, Parallel Operation of synchronous generators, synchronization of ac g synchronizing power, concept of X_d, and X_q.

UNIT-II
Synchronous Machine II:
Two Reaction Theory, Power flow equations of cylindrical and salient pole machines. Characteristics, Synchronous Motor, power flow and torque equation, Effect of var current at different loads, V- Curves, Hunting, damper windings, synchronous cond application of synchronous motor

OLD SYLLABUS

BEE 14: NETWORK ANALYSIS AND SYNTHESIS

L	T	P	(Credit =5)
3	1	2	

UNIT I

Introduction to Graph Theory:

(9 Lectures)

Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Nodal methods of analysis.

UNIT II:

Network Functions:

(9 Lectures)

Concept of Complex frequency , Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot.

UNIT III

Two Port Networks:

(9 Lectures)

Characterization of LTI two port networks ZY, ABCD and h parameters, reciprocity and symmetry. Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks& Π Representation.

UNIT IV

Network Synthesis:

(9 Lectures)

Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms.

Filters:

Image parameters and characteristics impedance, passive and active filter fundamentals, low pass, high-pass, (constant K type) filters, and introduction to active filters.

NEW SYLLABUS

BEE 14: NETWORK ANALYSIS AND SYNTHESIS

L	T	P	(Credit =5)
3	1	2	

UNIT I

Network Theorems

(9 Lectures)

Fundamentals to Network Analysis, Thevenin's and Norton's theorem, Superposition theorem, Maximum Power Transfer theorem, Millman's theorem, Tellegen's theorem, Compensation theorem and Reprocity theorem. Problems with ac and dependent sources.

UNIT II:

Two Port Networks:

(9 Lectures)

Characterization of LTI two port networks Z, Y, ABCD and h parameters, reciprocity and symmetry. Inter-relationships between the parameters, Inter-connections of two port networks, Ladder and Lattice networks, T & Π Representation.\

UNIT III

Introduction to Graph Theory: **(9 Lectures)**
Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Nodal methods of analysis.

Network Functions:
Concept of Complex frequency , Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot.

UNIT IV

Network Synthesis: **(9 Lectures)**
Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms.
Introduction to Filters.

Justification:

1. **Network Theorem** chapter has been included as the content is taught in first year with reference to DC sources only. With AC and dependent sources the chapter is not available in any course as the part of B. Tech. curriculum.

2. Rearrangement in the sequence of units has been made to enable the student's learning more effective.

3. Filters has been deleted as Electrical filters with inductors are bulky and obsolete from many of the standard syllabi. Instead modern and electronic filters are used.

2018.1.12   <u>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।</u>

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 स्ट्क्चर 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 ELECTRICAL ENGINEERING
MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY,
GORAKHPUR

<u>Dean UGS & Entrepreneurship</u>   Dated: 31-01-2018

The Meeting of members of Board of studies (BOS) was held in the department on 27.01.2018 at 11.00 a.m. Please find enclosed herewith the recommendations of BOS regarding panel of examiners for theory and practical examinations (internal/external) of UG courses for the even semester of session 2017-18 as per the ordinance of the University. The Syllabi of B. Tech. courses BEE-14, BEE-15 and BEE-20 were discussed and modified with proper justification. Existing and modified syllabi is attached herewith.

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1/2/18

(Prof. S/K Srivastava)
Head

MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY,
GORAKHPUR – 273 010 (UP) INDIA
(formerly M. M. M. Engineering College, Gorakhpur)

ELECTRICAL ENGINEERING DEPARTMENT

Minutes of Meeting of Members of Board of Studies (BOS) held on 27.01.2018 at 11.00 A.M. in the Office of Head, Electrical Engineering Department

Following members were present:

1.	Prof. S.K. Srivastava	Chairman
2.	Prof. K. G. Upadhyay	Internal Member
3.	Sri K.P. Singh	Internal Member
4.	Prof. A.K. Pandey	Internal Member
5.	Prof. A.N Tiwari	Internal Member
6.	Dr. Prabhakar Tiwari	Internal Member
7.	Dr. L.B. Prasad	Internal Member
8.	Dr. Awadhesh Kumar	Internal Member
9.	Dr. Navdeep Singh	Internal Member
10.	Sri Shekhar Yadav	Internal Member
11.	Prof. K. S. Verma	External Member
12.	Er. Ajay Kumar	External Member

Dr. G.K. Singh (External Member), Er. Himanshu Sharma (External Member) and Sri K. B. Sahay (Internal member) could not attend the meeting.

The following decisions have been taken:

1. Panel of Examiners for theory and practical examinations (Internal/External) of UG & PG program (Even Sem) & Comprehensive Exam of Ph.D scholars for 2017-18 have been discussed and finalized.

2. The Syllabi of B. Tech. courses BEE-14, BEE-15 and BEE-20 were discussed and modified with proper justification. Existing and modified syllabi is attached herewith.

3. The syllabus of M. Tech. course MEE-104 was discussed and modified. The same is attached herewith.

4. In the ordinances, curricula and syllabi for undergraduate Programme for newly admitted students from session 2014-15 in the page no. 49, for Senior year, semester VIII, category DC, paper code BEE-44, subject Utilization & Traction (L. T. P 3. 1. 2) has been given 5 credit courses (Photocopy attached), but it is actually 4 credit course. The detail of the subject Utilization & Traction, paper code BEE-44 is mentioned of 4 credits in Engineering Fundamentals & Departmental core (Electrical Engg.) for year IV at page no. 50 (Photocopy attached) at the page no. 319, where the syllabus of Utilization & Traction is given, that is also of 4 credit course (Photocopy attached). So, the above subject of paper code BEE-44 should be modified as a 4-credit course, instead of 5 credit course.

Meeting ended with Vote of Thanks to the Chair.

(Shekhar Yadav)   (Navdeep Singh)   (Awadhesh Kumar)

(A. K. Pandey)   (A. N. Tiwari)   (Prabhakar Tiwari)   (L. B. Prasad)

(K. P Singh)   (K.G.Upadhyay)   (Ajay Kumar)   (K.S Verma)

(S.K. Srivastava)

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MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY
GORAKHPUR – 273 010 (UP) INDIA
(formerly M. M. M. Engineering College, Gorakhpur)

ELECTRICAL ENGINEERING DEPARTMENT

EED +91-0551-6050028

Telefax-+91-0551-2270011

Minutes of Meeting of Members of Board of Studies (BOS) held on 25.01.2017 at 11.30 a.m. in Office of Head, Electrical Engineering Department
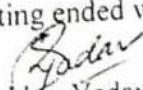
Following members were present:

		Chairman
1.	Dr. S.K. Srivastava	Internal Member
2.	Dr. K. G. Upadhyay	Internal Member
3.	Sri K.P. Singh	Internal Member
4.	Dr. A.K. Pandey	Internal Member
5.	Dr. A.N Tiwari	Internal Member
6.	Dr. L.B. Prasad	Internal Member
7.	Sri Awadhesh Kumar	Internal Member
8.	Sri Kishan Bhushan Sahay	Internal Member
9.	Dr. Navdeep Singh	Internal Member
10.	Sri Shekhar Yadav	External Member
11.	Dr. R. Mahanty	External Member
12.	Er. Ambrish Kumar	
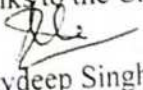
Dr. Yaduvir Singh and Er. Himanshu Sharma could not attend the meeting.

The following decisions have been taken:

1. Panel of Examiners for theory and practical examinations (internal/external) for even semester of session 2016-17 for UG & PG program (new courses as per the Ordinance of M. M. M. University of Technology and old courses as per Dr APJAKTU Lucknow, earlier UPTU Lucknow) have been discussed and finalized.

2. Panel of Examiners for M. Tech. dissertation (Viva–Voce Exam.) of students admitted in academic session 2015-16 have been discussed and finalized.

3. Panel of Examiners for Comprehensive Examination, Session 2016-17, of Ph.D Research Scholar (Mr. Punit Srivastava & Rachit Srivastava) has been discussed and finalized.

4. The Syllabus of BEE-15, Introduction to Microprocessors has been discussed and modified, it will be effected from session 2017-18 onwards.

Meeting ended with Vote of Thanks to the Chair.

(Shekhar Yadav)   (Navdeep Singh)   (Kishan Bhushan Sahay)
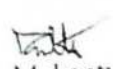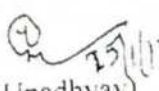
(Awadhesh Kumar)   (A. K. Pandey)   (A. N. Tiwari)   (L. B. Prasad)

(K.P Singh)   (R. Mahanty)   (Ambrish Kumar)   (K.G.Upadhyay)

(S.K. Srivastava)

DEPARTMENT OF APPLIED SCIENCES
MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY
GORAKHPUR

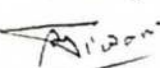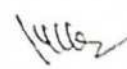**Minutes of Board of Studies of Department of Applied Sciences M.M.M. University of Technology, Gorakhpur held on Dated: 23.09.2017**

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

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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.

9

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, ¹H 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

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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).

DEPARTMENT OF APPLIED SCIENCE
MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY
GORAKHPUR – 273 010 (UP) INDIA

Letter No./BOS/Appl.Sc./M.M.M.U.T/ 72 /2018   Date: 30/01/2018

Dean U.G. Studies and Entrepreneurship

Please find enclosed herewith the minutes of the meeting of the BOS of Department of Applied Science held on 30.01.2018 at your end.

(Dr. D. Kandu)
HASD

BOARD OF STUDIES
DEPARTMENT OF APPLIED SCIENCE
MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY
GORAKHPUR – 273 010 (UP) INDIA

Minutes of meeting of Board of Studies of Department of Applied Science, M. M. M. University of Technology, Gorakhpur held on Dated: 30.01.2018

The following were present:

List of Member of BOS

Sr. No.	Name	Member	Signature
1.	Dr. D. Kandu	Chairman	
2.	Prof. D.K. Dwivedi	Internal Member	
3.	Prof. Arjun Dubey	Internal Member	
4.	Dr. B.K. Pandey	Internal Member	
5.	Dr. S. N. Singh	Internal Member	S. N. Singh
6.	Dr. R. K. Yadav	Internal Member	Absent
7.	Dr. V. K. Mishra	Internal Member	
8.	Dr. P.P. Pande	Internal Member	PPande
9.	Dr. S.P. Singh	Internal Member	
10.	Dr. A.K. Barnwal	Internal Member	Amit
11.	Dr. Harish Chandra	Internal Member	
12.	Shri. Ravi Kr. Gupta	Internal Member	
13.	Dr. Krishna Kumar	Internal Member	
14.	Dr. Abhijit Mishra	Internal Member	Abhijit Mishra
15.	Dr. Abhishek Gupta	Internal Member	
16.	Dr. Ram Keval	Internal Member	
17.	Dr. G. Anantharaman	Department of Chemistry, IIT Kanpur, Kanpur	
18.	Prof. A. K. Singh	Department of Physics, BHU, Varanasi	

The following decisions were taken:

1. The list of examiners for Theory & Practical Examination of Physics, Chemistry, Mathematics, and Humanities for even semester Session 2017-18 was prepared.
2. The syllabus of M.Sc. Physics with specialization in electronics was recommended to be effective from the academic session 2018-19.
3. The syllabus of human values and professional ethics (BAS-11) is revised to be effective from the academic session 2018-19.
4. Panel of examiners for comprehensive examination of Ph.D. students admitted in the academic session 2017-18 was recommended.

The meeting ended with thanks to the chairman.

(Dr. D Kandu)
HASD

Copy to:-
1. Dean P.G. Studies and R. & D.
2. Dean U.G. Studies and Entrepreneurship

(Dr. D Kandu)
HASD