



## Minutes of Meetings (MoM) of Board of Studies (BoS)

**Academic Year : 2018-19**

**School : School of Studies of Engineering and Technology**

**Department : Chemical Engineering**

**Date and Time : May 15, 2018 - 11:00 AM**

**Venue : HoD room**

The scheduled meeting of members of Board of Studies (BOS) was held today (15th May 2018) in the office of the HoD Chemical Engineering to design and discuss the scheme and syllabus of B.Tech. (Chemical Engineering) VII and VIII Semester as per CBCS. Following members were present in the meeting:

1. Prof. S. N. Saha (HoD Chemical Engg. - cum- Chairman, BOS)
2. Dr. A. K. Chandraker (Member BOS, Asst. Prof., Dept. of Chemical Engg.)
3. Mr. Neeraj Chandraker (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
4. Mr. Amit Jain (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
5. Mrs. A. N. Joshi (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
6. Mr. G. P. Dewangan (Invited Member, Asst. Prof., Dept. of Chemical Engg.)
7. Mr. V. P. Yadav (Invited Member, Asst. Prof., Dept. of Chemical Engg.)

In this meeting above mentioned members discussed and proposed the scheme and syllabus of B. Tech. (Chemical Engineering) VII and VIII semester as per CBCS as enclosed 20 pages duly signed by the chairman, member and invited members of the BOS.

By inadvertent mistake subject names of the Practical Courses of VI semester of course codes CH6PPC06 and CH6PPC07 were not mentioned, these subject names are Mass Transfer-II Lab and Process Dynamics and Control Lab, respectively.

The following courses were revised in the of B. Tech. Final year (VII and VIII Semesters) :

- ❖ New Separation Processes (CH7TPC15)
- ❖ Petroleum Refinery Engineering (CH7TPE41)
- ❖ Project Engineering, Economics & Management (CH8TPC17)
- ❖ Petrochemical Technology (CH8TPE51)
- ❖ Optimization Techniques (CH8TOE41)



The following new courses were introduced in the of B. Tech. Final year (VII and VIII Semesters):

- ❖ Process Equipment Design-II (CH7TPC13)
- ❖ Design and Development of Catalyst (CH7TPE43)
- ❖ Membrane Separation Processes (CH8TPE53)
- ❖ Water Conservation and Management (CH7TOE32)
- ❖ Process Modeling & Simulation (CH8TOE42)
- ❖ Renewable Energy (CH8TOE43)

Since the member Prof. Chandan Guha (Department of Chemical Engineering, Jadavpur University, Kolkata) could not attend this meeting due to his pre-occupation, as per his suggestion on telephonic conferencing with the members, this scheme and syllabus is being sent to the external BOS member Prof. C. Guha, for his review and formal consent as on today (15th May 2018).

विभागाध्यक्ष, रासायनिक अभियांत्रिकी  
**HoD, Chemical Engineering**  
प्रौद्योगिकी संस्थान/Institute of Technology  
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)  
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Signature & Seal of HoD



## Minutes of Meetings (MoM) of Board of Studies (BoS)

**Academic Year : 2018-19**

**School : School of Studies of Engineering and Technology**

**Department : Chemical Engineering**

**Date and Time : 11 September, 2019 - 11:30 AM**

**Venue : HoD room**

The scheduled meeting of members of Board of Studies (BOS) was held today (11 September 2018) in the office of Prof. S. N. Saha, Chemical Engineering Department to discuss mainly the VRET 2018 Syllabi, new scheme and syllabi of B.Tech. (Chemical Engineering) I and II Semester. Following members were present in the meeting:

1. Prof. S. N. Saha (Member BOS, Dept, of Chemical Enge.)
2. Dr. A K. Chandrakar (HoD I/c. Chemical Fags - cum- Chairman. BOS)
3. Mr. Amit Jain (Invited Member. Asst. Prof, Dept. of Chemical Enge)
4. Mrs. A. N. Joshi (Invited Member, Asst. Prof, Dept of Chemical Enge)
5. Mr. G. P. Dewangan (Invited Member, Asst Prof, Dept. of Chemical Enge.)
6. Mr. Saurabh Meshram (Invited Member, Asst. Prof., Dept. of Chemical Engg.)

The scheme and syllabi of B. Tech (Chemical Engineering) I and II semester already approved by the due committee on 31 July 2018 have been vetted and approved by the BOS Chemical Engineering committee

The committee has discussed and resolved to approve the syllabi of Vishwavidyalaya Research Entrance Test- 2018 (VRET-2018) for Paper-I (Research Methodology) and Paper-II (Chemical Engineering).

In this meeting above mentioned members discussed and proposed the scheme and syllabus of B. Tech. (Chemical Bagincering) I and II semester as per CBCS as enclosed 20 pages duly signed by the chairman, member and invited members of the BOS.

The following courses were revised in the of B. Tech. First year (I and II Semesters) :

- ❖ Physics (CH01TBS01)
- ❖ Basic Electrical Engineering (CH01TES01)
- ❖ Mathematics-I (CH01TBS02)
- ❖ Environmental Studies (CH01TMC01)
- ❖ Physics Lab (CH01PBS01)
- ❖ Basic Electrical Engineering Lab (CH01PES01)



- ❖ Engineering Graphics & Design Lab (CH01PES02)
- ❖ Mathematics-II (CH02TBS03)
- ❖ Chemistry (CH02TBS04)
- ❖ Thermodynamics (CH02TES03)

The following new courses were introduced in the of B. Tech. First year (I and II Semesters):

- ❖ English (CH01THS01)
- ❖ Programming For Problem Solving (CH02TES02)
- ❖ Programming For Problem Solving Lab (CH02PES03)

The members have opined and resolved that in the M.Tech. I semester scheme and syllabi Fluidization Engineering subject (Course No. CEPC1103) be read as Advanced Fluidization Engineering.

The matter related to appointment of examiners appears to be too early to recommend presently. At the time of getting the issue matured enough, the policy decision to be taken by the competent body will be deemed to be approved by BOS.

Since the external BOS member Prof. Chandan Guha from Kolkata could not attend this meeting due to his pre-occupation, as per his suggestion on telephonic conferencing with the members, this scheme and syllabus is being sent to him for his review and formal consent.

विभागाध्यक्ष, रासायनिक अभियांत्रिकी  
**HoD, Chemical Engineering**  
प्रौद्योगिकी संस्थान/Institute of Technology  
गुरु घासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)  
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Signature & Seal of HoD

## Scheme and Syllabus



DEPARTMENT OF CHEMICAL ENGINEERING  
INSTITUTE OF TECHNOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)  
(A Central University Established by the Central University Ordinance 2009, No. 3 of 2009)

**SCHEME FOR EXAMINATION**  
**B.Tech. (FOUR YEAR) DEGREE COURSE, CHEMICAL ENGINEERING**

**FOURTH YEAR, SEVENTH SEMESTER**

S. No.	Course No.	Subject	Periods			Evaluation Scheme					Credits
			L	T	P	Sessional			ESE	Sub Total	
						IA	MSE	Total			
01.	CH7TPC13	Process Equipment Design- II <i>new course</i>	1	-	-	20	20	40	60	100	4
02.	CH7TPC14	Chemical Reaction Engineering-II	3	1	-	20	20	40	60	100	4
03.	CH7TPC15	New Separation Processes	3	1	-	20	20	40	60	100	4
04.	CH7TPE4X		3	1	-	20	20	40	60	100	4
05.	CH7TOE3X		3	1	-	20	20	40	60	100	4
<b>PRACTICAL</b>											
01.	CH7PPC08	Minor Project	-	-	6	30	-	30	20	50	3
02.	CH7PPC09	Vocational Training Viva Cum Seminar	-	-	3	50	-	50	-	50	2
<b>TOTAL</b>			<b>15</b>	<b>5</b>	<b>9</b>					<b>600</b>	<b>25</b>

IA - Internal Assessment

MSE - Mid Semester Examination

ESE - End Semester Examination

Total Marks - 600

Total Periods - 29

Total Credits - 25

BOS held on 15<sup>th</sup> May 2018

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*Chandrika*  
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DEPARTMENT OF CHEMICAL ENGINEERING  
INSTITUTE OF TECHNOLOGY

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)  
(A Central University Established by the Central University Ordinance 2009, No. 3 of 2009)

**LIST OF PROFESSIONAL ELECTIVES OFFERED BY DEPARTMENT OF CHEMICAL ENGINEERING  
FOR VII and VIII SEMESTER**

Semester	Subject Code (PE)	Subject
VII	CH7TPE41	Petroleum Refinery Engineering
	CH7TPE42	Polymer Technology - I
	CH7TPE43	Design and Development of Catalyst <i>New Course</i>
VIII	CH8TPE51	Petrochemical Technology
	CH8TPE52	Polymer Technology - II
	CH8TPE53	Membrane Separation Processes <i>New Course</i>

PE - Professional Elective

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BOS held on 15<sup>th</sup> May 2018



DEPARTMENT OF CHEMICAL ENGINEERING  
INSTITUTE OF TECHNOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)  
(A Central University Established by the Central University Ordinance 2009, No. 3 of 2009)

LIST OF OPEN ELECTIVES OFFERED FOR VII and VIII SEMESTER

Semester	Subject Code (OE)	Subject
VII	CH7TOE31	Transport Phenomena
	CH7TOE32	Water Conservation and Management <span style="float: right;">New Course</span>
VIII	CH8TOE41	Optimization Techniques
	CH8TOE42	Process Modeling & Simulation <span style="float: right;">New Course</span>
	CH8TOE43	Renewable Energy <span style="float: right;">New Course</span>

OE- Open Elective

Note: In addition to the open elective courses, as prescribed above, the students are free to opt for any other subject of same credit from inter/intra school duly approved by the Board of Studies of the respective departments.

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Chandrasekhar  
15/05/18

A  
15/05/18

M  
15/05/18

Golan  
15/05/18

Ajith  
15/05/18

Sudha  
15/05/18

BOS held on 15<sup>th</sup> May 2018



## B.Tech. VII Semester

### CH7TPC13 : Process Equipment Design- II ( 3 1 0 )

Design of Heat Transfer Equipments : Double Pipe Heat Exchanger, Shell and Tube Heat Exchanger, Vertical & Horizontal Condensers and Evaporators.

The candidates will be allowed to use the following reference book in the examination hall :

1. Hand book of Chemical Engineering J. H. Perry
2. Tubular Heat Exchange Manufacture Association Manual
3. ISI Codes.

Candidates have to bring their own copies of the above books and they will be not supplied by the university or the examination centers.

#### Text Books :

1. Process Heat Transfer by D. Q. Kern
2. Heat Transmission by McAdams
3. Unit Operations of Chemical Engineering by McCabe Warren, L Smith Julian and Harriot Peter, Fifth Edition, McGraw Hill Inc.
4. Chemical Engineering by J. M. Coulson and Richardson, Volume- I

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*Meharika*  
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*Cydon*  
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*Sudaba*  
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### CH7TPE43: Design and Development of Catalyst (3 1 0)

Structure of Solid Surfaces, Chemisorption and Physisorption, Thermodynamics and Kinetics of Surface Processes, Principles of Heterogeneous Catalysis, Preparation, Characterization and Classification, Kinetics of Heterogeneous Reactions, Physical, Chemical and Mathematical Description of Catalyst Deactivation, Deactivation by Fouling, Poisoning and Sintering, Deactivation and Regeneration of Catalyst Pellets, Deactivation and Regeneration of Fixed Beds, Dynamics of Polyfunctional Catalysts, Electro catalysis and Photocatalysis, Mechanism and Kinetics of Some Typical Heterogeneous Catalytic Reactions, Applications in Fertilizer, Petroleum, Petrochemical Industries and Pollution Control.

#### Text Books :

1. Preparation of Catalyst VI : Scientific bases for the preparation of Heterogeneous Catalysts by G. Poncelet, J. Martens, B. Delmon, Elsevier
2. Catalyst Preparation : Science and Engineering by John Regalbuto, CRC Press

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Geetha 15/05/18  
Manish 15/05/18  
Vijay 15/05/18  
Ajay 15/05/18  
Gaurav 15/05/18  
Sudhakar 15/05/18





**CH7TOE32: Water Conservation and Management ( 3 1 0 )**

Introduction, Water Cycle, Water Storage, Water Quality, Water Conservation in Homes, Water Conservation in Work Place; Water Management-Water Quality, Controlling Use and Quality of Water, Water Flow Management, Water Quality Control, Testing Water Salinity, Preserving Water Quality, Minimizing Evaporation, Water Sanitation, Water Audits, Water Conservation in Agriculture, Water Conservation in Process Industries, Water Conservation in Construction Industries, Water Conservation in Service Industries.

**Text Books :**

1. Water Conservation, Management and Analysis by V. Madireddi and Subba Rao, Readworthy Publications (P) Ltd
2. Protection and Conservation of Water Resources by Hadrian F. Cook, John Wiley & Sons Inc.
3. Water Resources, Conservation and Management by S.N. Chatterjee, Atlantic Publishers & Dist.

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### CH8TPE53: Membrane Separation Processes (3 1 0)

Introduction to Membrane Separation Process, Principle of Membrane Separation, Physical and Chemical Properties of Membranes, Classification, Driving Forces in Membrane Separation Processes, Advantages and Limitations of Membrane Processes, Membrane Types, Materials, Preparation and Characterization, Various Methods of Membrane Manufacture, Structure and Function of Symmetric and Asymmetric Membranes, Membrane Modules, Module Cascading, Chemical Potential and Osmosis, Retention and Permeability and its Estimation, Salt Rejection, Concentration Polarization and Membrane Fouling, Concept of Zeta Potential, Major Application Areas of Membrane, Various Membrane Processes, Design, Operation, Maintenance and Industrial Applications of Membrane Based Processes.

#### Text Books :

1. Separation Process Principles by J. D. Seader, Ernest J. Henley, Wiley
2. Separation Process Engineering by Phillip C. Wankat, PHI
3. Membrane Technology and Applications by R W Baker, John Wiley and Sons, Ltd, UK.
4. Membrane Separation Processes by K. Nath, PHI, New Delhi

#### Reference :

1. Webcourse (NPTEL) Novel Separation Processes by Prof. Sirshendu De, IIT Kharagpur

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### CH8TOE42: Process Modeling & Simulation (3 1 0)

**Introduction :** Uses of Mathematical Models, Scope of Coverage, Principles of Formulations. Mathematical Modeling in Chemical Reaction Engineering: CSTR, PFR, Batch Reactor, Semibatch Reactor, Series of Isothermal CSTR, Constant Hold-Up CSTR's, CSTR's with Variable Hold Ups, Gas Phase Pressurized CSTR, Non Isothermal CSTR, Bioreactor, Trickle Bed Reactor.

**Mathematical Modeling in Mass Transfer :** Ideal Binary Distillation Column, Multi-Component Non-ideal Distillation Column, Batch Distillation with Hold Up, Steam Distillation, Multi-Solute Batch Liquid- Liquid Extraction, Continuous Extraction, Multistage Countercurrent Extraction, Plug Flow Type Liquid- Liquid Extraction, Reactor with Mass Transfer, Absorption, Adsorption.

**Mathematical Modeling in Heat Transfer :** Two Heated Tanks, Single Component Vaporizer, Double Pipe Heat Exchanger, Shell and Tube Heat Exchanger, Multicomponent Flash Drum, Cooling Towers.

**Mathematical Modeling of Other Chemical Processes:** Interacting and Non-Interacting Systems with and without Heaters, Isothermal Hydraulic System, Forward and Backward Feed Triple Effect Evaporator.

Introduction of MATLAB and Use of Language, Simulation, Program Development and Numerical Solutions of Above Processes.

#### Text Books :

1. Process Modeling, Simulation and Control for Chemical Engineers by W. L. Luyben, McGraw Hill, 1990.
2. Process Plant Simulation by B. V. Babu, Oxford University Press, 2004.
3. Optimisation Techniques for Chemical Engineers by A. Hussain and K. Gangaiah, Macmillan, 2001.
4. Process Control: Modeling, Design and Simulation by B. W. Bequette. Prentice-Hall India, 2006.
5. Elements of Chemical Reaction Engineering by Fogler, Prentice Hall of India.

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Gauri 15/05/18  
Chandika 15/05/18  
Aparna 15/05/18  
Gala 15/05/18  
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### CH8TOE43: Renewable Energy (3 1 0)

**Introduction-** World Energy Status, Current Energy Scenario in India, Environmental Aspects of Energy Utilization, Energy and Sustainable Development.

**Solar Energy** - Basic Concepts, Flat Plate and Concentrating Collectors, Solar Desalination, Solar Photo Voltaic Conversion, Solar Cells.

**Wind Energy** - Availability, Wind Power Plants, Wind Energy Conversion Systems, Site Characteristics, Types of Wind Turbines.

**Energy from Biomass** - Biomass Resources, Biomass Conservation Technologies- Direction Combustion, Pyrolysis, Gasification, Anaerobic Digestion, Bioethanol and Biodiesel Production.

**Other Renewable Sources** - Tidal Energy, Geothermal Energy, Hydroelectric.

#### Text Books :

1. Renewable Energy Resources by John Twidell and Tony Weir, Taylor & Francis
2. Renewable Energy Sources and Emerging Technologies by D.P. Kothari, K. C. Singal, Rakesh Ranjan, PHI Learning Pvt Ltd.
3. Renewable Energy Sources for Sustainable Development by Narendra Singh Rathore, N. L. Panwar, New India Publishing Agency

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SCHEME OF EXAMINATION										
B.TECH (FOUR YEAR) DEGREE COURSE										
FIRST YEAR, CHEMICAL ENGINEERING										
SEMESTER I (COURSE-A)										
EFFECTIVE FROM SESSION 2018-19										
SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/WEEK			EVALUATION SCHEME			CREDITS	
			L	T	P	IA	ESE	TOTAL		
<b>THEORY</b>										
1	CH01TBS01	PHYSICS	3	1	0	30	70	100	4	
2	CH01TES01	BASIC ELECTRICAL ENGINEERING	3	1	0	30	70	100	4	
3	CH01TBS02	MATHEMATICS-I	3	1	0	30	70	100	4	
4	CH01THS01	ENGLISH	3	0	0	30	70	100	3	
5	CH01TM01	ENVIRONMENTAL SCIENCES	3	0	0	...	...	..	0	
<b>PRACTICAL</b>										
1	CH01PBS01	PHYSICS LAB	0	0	3	30	20	50	1.5	
2	CH01PES01	BASIC ELECTRICAL ENGINEERING LAB	0	0	2	30	20	50	1	
3	CH01PES02	ENGINEERING GRAPHICS & DESIGN	1	0	3	30	20	50	2.5	
4	CH01PMC01	INDUCTION TRAINING PROGRAMME	0	0	2	-	-	-	-	
TOTAL									20	

IA - INTERNAL ASSESSMENT ESE - END SEMESTER EXAM. L- LECTURE T- TUTORIAL P-PRACTICAL

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New Course Introduced

Subject code	L	T	P	Credit
CH01THS01/ENGLISH	3	0	0	3

#### 1. Vocabulary Building

The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives. Synonyms, antonyms, and standard abbreviations.

#### 2. Basic Writing Skills

Sentence Structures , Use of phrases and clauses in sentences , Importance of proper punctuation , Creating coherence , Organizing principles of paragraphs in documents , Techniques for writing precisely

#### 3. Identifying Common Errors in Writing

3.1 Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

#### 4. Nature and Style of sensible Writing

Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion.

#### 5. Writing Practices

Comprehension, Précis Writing, Essay Writing.

#### 6. Oral Communication (This unit involves interactive practice sessions in Language Lab)

- Listening Comprehension
- Pronunciation, Intonation, Stress and Rhythm
- Common Everyday Situations: Conversations and Dialogues
- Communication at Workplace
- Interviews
- Formal Presentations

#### Suggested Readings:

- Practical English Usage. Michael Swan. OUP. 1995.
- Remedial English Grammar. F.T. Wood. Macmillan.2007
- On Writing Well. William Zinsser. Harper Resource Book. 2001
- Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
- Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

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Subject code/NAME	L	T	P	Credit
CH02TES02/PROGRAMMING FOR PROBLEM SOLVING	3	0	0	3

New Course Introduced

**Unit 1**

**Introduction to Programming (3 lectures)**

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) -

**Idea of Algorithm (3 lectures )**: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudo code with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

**Unit 2**

**Arithmetic expressions and precedence (12 lectures)**

Conditional Branching and Loops

Writing and evaluation of conditionals and consequent branching

Iteration and loops

**Arrays (6 lectures)**Arrays (1-D, 2-D), Character arrays and strings

**Unit 3**

**Basic Algorithms (6 lectures)**

Searching ,concept of binary search etc , Basic Sorting Algorithms Bubble sort etc.Finding roots of equations, introduction of Algorithm complexity

**Unit 4**

**Function (5 lectures)**

Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference binary search etc

**Recursion functions (5 lectures)** Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, etc.

**Unit 5**

**Structure (4 lectures)**

Structures, Defining structures and Array of Structures

**Pointers (3 lectures)** Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

**Suggested Text Books**

- (i) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- (ii) E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

**Suggested Reference Books**

- (i) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

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SUBJECT CODE/NAME	L	T	P	Credit
CH02PES03/PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	1.5

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.] New Course Introduced

**Tutorial 1:** Problem solving using computers:

**Lab 1:** Familiarization with programming environment

**Tutorial 2:** Variable types and type conversions:

**Lab 2:** Simple computational problems using arithmetic expressions

**Tutorial 3:** Branching and logical expressions:

**Lab 3:** Problems involving if-then-else structures

**Tutorial 4:** Loops, while and for loops:

**Lab 4:** Iterative problems e.g., sum of series

**Tutorial 5:** 1D Arrays: searching, sorting:

**Lab 5:** 1D Array manipulation

**Tutorial 6:** 2D arrays and Strings

**Lab 6:** Matrix problems, String operations

**Tutorial 7:** Functions, call by value:

**Lab 7:** Simple functions

**Tutorial 8 & 9:** Numerical methods (Root finding, numerical differentiation, numerical integration):

**Lab 8 and 9:** Programming for solving Numerical methods problems

**Tutorial 10:** Recursion, structure of recursive calls

**Lab 10:** Recursive functions

**Tutorial 11:** Pointers, structures and dynamic memory allocation

**Lab 11:** Pointers and structures

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