Cummins College of Engineering for Women

(An autonomous institute affiliated to Savitribai Phule pune university)

Karve Nagar, Pune - 411 052.

Syllabus Structure and Syllabus

of

F. Y. BTech

2023 Pattern [R1]

List of Abbreviations

Abbreviation	Title
PCC	Programme Core Course
BSC	Basic Science Course
ESC	Engineering Science Course
PE	Programme Elective Course
OE	Open Elective
VSEC	Vocational and Skill Enhancement Course
CC	Co-curricular Courses / Liberal Learning Course
IKS	Indian Knowledge System
VEC	Value Education Course
RM	Research Methodology
INTR	Internship
PROJ	Project
CEP	Community Engagement Project
RM	Research Methodology
Mm	Multidisciplinary Minor
AEC	Ability Enhancement course

First Year
Curriculum for UG Degree Course in BTech. E&TC/ Instru / Mech Programs
(Academic Year: 2025-26 Onwards)
Semester-II

Course Code	Course Title	Teaching Scheme Hours / Week			Cr	Examination Scheme			Total Marks
		L	T	P		ISE	ESE	Pr/Or	
BSC102	Chemistry	3	0	0	3	50	50	0	100
BSC201	Multivariate Calculus	3	1	0	4	50	50	0	100
*PCCxx 201	Programming Core Course	2	0	0	2	25	25	0	50
ESC102	Basics of Electrical & Electronics Engineering	3	0	0	3	50	50	0	100
IKS201	Indian Knowledge System	2	0	0	2	50	0	0	50
CC102	Liberal Learning Course	1	0	2	2	50	0	0	50
BSC102L	Chemistry Lab	0	0	2	1	25	0	0	25
ESC102L	Basics of Electrical & Electronics Engineering Lab	0	0	2	1	25	0	0	25
VSEC201L	Programming Skills in Python Language	0	0	4	2	25	0	25	50
	Total =	14	01	10	20	350	175	25	550

L=Lecture, T=Tutorial, P= Practical, Cr= Credits, ISE =In Semester Evaluation, ESE =End Semester Examination, Pr/Or = Practical/Oral.

*PCCEC201: Principles of Communication Systems   ;   *PCCME201: Engineering Mechanics
PCCIN201: Principles of Measurement and Automation System

BSC102 Chemistry

Teaching scheme:
Lecture: 3hrs/week
Credits: 3

Examination scheme:
In Sem: 50 marks
End Sem: 50 marks

Course Objectives

The Chemistry course is designed such that the students will:

1. Understand chemical and electrochemical principles relevant in the engineering context.

2. Assimilate chemical processes at lab and industrial scale of synthesis.

3. Get familiar with methods of chemical analysis.

4. Correlate structure-property relationship.

5. Inculcate basic problem-solving skills involving chemistry fundamentals.

Course Outcomes

1. To apply electrochemical principles in battery technology and fuel cells.

2. To analyze the types & factors related to corrosion and solve problems related to its control.

3. To outline the processes of synthesis of fuels, Si-semiconductors and nanomaterials.

4. To analyze the quality of water and fuels using analytical techniques.

5. To determine pollutants present in wastewater and extract metals from E-waste.

UNIT I: Electrochemical Applications in Engineering

A. Electrochemical cell, Electrode potential, Nernst equation, reference electrodes, battery characteristics, secondary batteries, Lead-acid, Lithium-ion battery, Fuel cell technology.

B. Electrochemical theory of corrosion, causes and factors affecting corrosion, types, Cathodic and anodic protection, corrosion control methods such as protective coatings-organic using epoxy, PU, polyurea etc., metal coatings like hot dipping, electroplating and metal cladding.

Basic Sciences and Humanities

UNIT II: Industrially relevant materials

A. H_2: Properties and applications such as fuel, synthesis, storage and transport, Si chemistry and Processing Si for semiconductor applications such as chip/ photovoltaic devices.

B. Nanomaterials: Introduction, classification, properties, approaches to synthesis, Carbon based nanomaterials such as CNT, graphene and quantum dots, (properties and applications for electronics).

UNIT III: Water analysis and sustainable chemistry

A. Sources, Impurities in water, hardness determination and metals in water by volumetry and flame photometry, pH, TDS, BOD, COD. Water softening by ion exchange method, desalination of brackish water by membrane filtration techniques-reverse osmosis, electrodialysis.

B. Detection of pollutants in wastewater and extraction of precious metals from E-Waste.

UNIT IV: Carbon based energy materials

A. Coal types, GCV, NCV and proximate, ultimate analysis for quality determination.

B. Biodiesel and Power alcohol: Preparation, properties and applications.

Textbooks:

1. S.S. Dara 'Engineering Chemistry' S. Chand Publications
2. B.S. Chauhan 'Engineering Chemistry': Univ Sc Press. (Third edition)
3. 'A Textbook of Engineering Chemistry' by Shashi Chawla: Dhanpat Rai & Co. (2015)
4. 'A Textbook of Engineering Chemistry' Jain and Jain: Dhanpat Rai & Co.
5. G. Chatwal 'Instrumental methods of Chemical Analysis' Himalaya publication house.
6. A Basic course in Environmental Studies by S. Deswal and A. Deswal.
7. A textbook of Environmental studies by Shashi Chawla.

Reference books:

1. Ram D. Gupta, 'Hydrogen fuel 'C.R.C. Publications.
2. Robert Braun; Instrumental methods of analysis Pharma med press.
3. J.D. Lee,;Concise Inorganic Chemistry, 4 th edition, Wiley Publication (2019) M.G. Fontana, "Corrosion Engineering", Mac-Graw Hill Publications.

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BSC201 Multivariate Calculus

Teaching Scheme:
Lectures: 3 Hrs/Week
Tutorial: 1 Hr/Week
Credits: 4

Examination Scheme:
In-Semester: **50** Marks
End-Semester: **50** Marks

Course Objectives:

1. To familiarize the students with techniques of differentiation and integration of multivariable functions.

2. To equip the students to deal with advanced levels of Mathematics, and applications that would be essential for their discipline**.**

Course Outcomes:

After completion of this course, students will be able to

CO1: Calculate partial derivatives and solve problems using partial derivatives.

CO2: Analyze extrema of function of several variables and apply least square method for data fitting.

CO3: Solve double integral, triple integral over the region.

CO4: Determine physical parameters using double and triple integral.

Unit – I: Partial differentiation

Function of several variables, partial derivatives, Geometrical interpretation of partial derivatives, chain rule, higher order partial derivatives, Euler's theorem.

Unit – II: Applications of partial differentiation.

Maxima, minima and saddle points, second derivative test, constrained extrema and Lagrange's multipliers, applications in optimization of functions of several variables. Applications of first order partial derivatives in data fitting using the method of the least squares for linear and quadratic model.

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Unit – III: Double integration

Tracing of curves in Cartesian and Polar coordinate system, double integrals over a rectangle, double integrals over regions, change of order of integration, Introduction of Jacobian determinant for two variables, double integral in polar coordinates, The Gaussian integral.

Unit – IV: Triple integration

Triple integral over a box, triple integrals by iterated integration, change of variables, Cylindrical and Spherical coordinates, The Jacobian determinant for three variables, evaluation of triple integral.

Unit – V: Applications of Double and Triple integration

Applications of double integral and triple integral: Area of plane Lamina, mass of plane lamina, surface area, volume, mass of solid.

Textbooks:
1. B. V. Ramana, **'Higher Engineering Mathematics',** *Tata McGraw Hill Publications,* (2007).
2. B.S. Grewal, **'Higher engineering Mathematics'***, Khanna publishers, (*40th edition), (2008).
3. Maurice Weir, Joel Hass, '**Thomas' Calculus'**, *Pearson India*, (13th edition), (2016).

Reference Books:

1. J.E. Marsden, A. J. Tromba and A. Weinstein, **Basic Multivariable Calculus'**, *Springer,* (3rd edition)*,* (1993).
2. G. B. Thomas and R. L. Finney, **Calculus and Analytic geometry'**, *Pearson, Reprint* (9th Edition), (2002).
3. Sudhir Ghorpade, Balmohan Limaye, **A Course in Multivariable Calculus and Analysis'***,* (Undergraduate Text in Mathematics), *Springer* (2009).
4. Dennis G. Zill, Warren S. Wright**, Multivariable Calculus**, **Early transcendental'**, *Jones & Bartlett Publisher* (4th edition), (2009).

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PCCEC201: Principles of Communication Systems

Teaching Scheme:
Lectures:2 Hours / Week
Credits: 2

Examination Scheme:
In Semester: 25 Marks
End Semester: 25 Marks

Course Objectives:

1. To introduce the basics of Electronic Communication.

2. To understand the basics of Analog communication and Digital Communication systems.

3. To understand modern communication systems.

Course Outcomes:

CO1: To explain basic communication systems and classify different types of signals.

CO2: To describe need of modulation and interpret analog modulation techniques.

CO3: To explain the sampling process and pulse modulation techniques.

CO4: To describe the need of digital communication with different modulation techniques.

CO5: To explain the evolution of wired and wireless communication systems.

UNIT I: Introduction to Electronic Communication:

Importance of communication, Elements of communication system, Types of electronic communication, signal bandwidth, channel bandwidth, Electromagnetic Spectrum, Types of Signals, Energy and power signal.

UNIT II: Basics of Analog Communication:

Baseband communication and its limitations, Need of Modulation, Types of modulation, Amplitude and

Frequency modulation, modulation index, Bandwidth, Comparison of amplitude and frequency modulation.

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UNIT III: Pulse Analog Modulation:

Sampling Process, Types of sampling, Sampling theorem, Aliasing, Aperture effect, Pulse analog modulation techniques - PAM, PPM, PWM.

UNIT IV: Basics of Digital Communication:

Elements of digital communication Need of digital communication over analog communication, Types of

Multiplexing, Modulation Techniques: Amplitude Shift Keying (ASK), Phase Shift Keying (PSK), and

Frequency Shift Keying.

UNIT V: Modern communication systems:

Optical communication system, Satellite Communication system, Radar, and Personal communication systems,

IEEE standards for wireless networks, Generations of Wireless communication.

Text Books:

1. George Kennedy, **"Electronic Communication Systems"**, *McGraw-Hill*, (5th Edition), (2013).

2. Simon Haykin, Michael Moher, **"Communication Systems"**, *Wiley*, (5th Edition), (2009).

3. Frenzel, **"Communication Electronics"**, *Tata McGraw-Hill*, (3rd Edition). (2008)

Reference Books:

1. Bernard Sklar, **"Digital Communications Fundamentals and Applications"**, *Prentice Hall P T R*, (2nd Edition), (2009).

2. A. B. Carlson and P. B. Crilly, **"Communication Systems"**, *McGraw-Hill*, (5th Edition), (2002).

3. T. L. Singal, **"Analog and Digital Communication"**, *Tata McGraw-Hill*, (1st Edition), (2012).

Basic Sciences and Humanities

PCCIN201 Principles of Measurement and Automation System

Teaching Scheme:	**Examination Scheme:**
Lectures: 2 hrs/week	In Semester: 25 Marks
Credits: 2	End Semester: 25 Marks

Course Objectives:

1. To acquire the basic knowledge of instrumentation system

2. To study principles and working of various sensing techniques

3. To select appropriate components for Instrumentation system

Course Outcomes:

On completion of this course, the student will be able to

CO1: Explain various measurement principles.

CO2: Define instrument characteristics.

CO3: Select appropriate measurement technique for given application.

CO4: Identify the components of automation system.

Unit I: Overview of Automation and measurement systems

Instrumentation system representation, static and dynamic characteristics, types of errors, basics of

Calibration, overview of automation tools and applications

Unit II: Measurement principles of resistive sensors

Resistive type of measurement principles with few examples - NTC, PTC, potentiometric sensors, strain gauges

Unit III: Measurement principles of capacitive sensors

Capacitive type of measurement principles with few examples - variable overlapping area, variable dielectric medium, variable inter plate distance

Unit IV: Measurement principles of inductive and piezoelectric sensors

Inductive, piezoelectric and miscellaneous type of measurement principles with few examples

Text Books:

1. C.S. Rangan, G.R.Sharma, V.S.V.Mani - 'Instrumentation Devices and Systems'

2. B.C. Nakra, K.K.Chaudhary - 'Instrumentation Measurement and Analysis'

3. William D. Stanley - 'Operational amplifiers with Linear Integrated Circuits'

4. C.D. Johnson - 'Process Control and Instrument Technology'

Reference Books:

1. D. Patranabis - 'Principles of Industrial Instrumentation'

2. William Andrews - 'Applied Instrumentation in Process Industries'

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PCCME201 Engineering Mechanics

Teaching Scheme: **Examination Scheme:**

Theory: 2 Hrs/week   In semester: 25 Marks

Credits: 2   End semester: 25 Marks

Course Objectives:

1. To familiarize students with the **concepts of static equilibrium,** center of gravity and moment of

inertia

2. To introduce the kinematics of particles and rigid bodies to find the velocity and acceleration

3. To introduce the kinetics of particles and rigid bodies to analyze the forces and moments

Course Outcomes:

After completing the course students will be able to

CO1: Apply the concept of force, moment, and static equilibrium in two- and three-dimensional systems

with the help of FBD

CO2: Determine the center of gravity and moment of inertia of the bodies

CO3: Analyse the motion of a particle to find the velocity and acceleration

CO4: Analyse particles and rigid body in motion using force and acceleration, work-energy, and

impulse-momentum principle

Unit 1

System of Forces and Equilibrium:

Two- and three-dimensional force system- rectangular components, Moment, Couple,

Resultant, scalars and vectors, units, Equilibrium - Equations of equilibrium, free body diagram, Equivalent force systems, Structures - 2D truss, method of joints, and method of section. Frame, beams, types of loading and supports

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Unit 2

Center of Gravity, Centroid and Mass Moment of Inertia: Centre of gravity, centre of mass and centroid, First and second moment of inertia and mass. Radius of gyration, parallel axis theorem

Unit 3

Kinematics of Particles and Rigid Body: Particles: Motion of particle with variable acceleration. General curvilinear motion. Tangential & Normal component of acceleration, Motion curves (a-t, v-t, s-t curves). Application of concepts of projectile motion and related numerical,

Rigid Body: Translation, Rotation and General Plane motion of Rigid body. The concept of Instantaneous centre of rotation (ICR) for the velocity. Velocity analysis of rigid body using ICR.

Unit 4

Kinetics of Particles and Rigid Body: Particles: Force and Acceleration: Introduction to basic concepts, D'Alembert Principle, concept of Inertia force, Equations of dynamic equilibrium, Newton's second law of motion. (Analysis limited to simple systems only.) **Work-Energy and Impulse-Momentum principle**.

Rigid Body: Translation, fixed axis rotation, general planner motion, work-energy, power, potential energy, impulse-momentum and associated conservation principle, Euler equation of motion and its applications.

Textbooks:

1. R. C. Hibbeler, 'Engineering Mechanics (statics and Dynamics), 12th Edition, *Pearson Publication*.

2. A. Nelson, 'Engineering Mechanics (statics and Dynamics), 12th Edition, *Mc Graw Hill Education*

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Reference Books:

1. Timoshenko and Young, 'Engineering Mechanics', *Tata Mc-Graw Hill*, New Delhi.

2. Mclean, and Nelson, 'Theory and problems of Engineering Mechanics (Statics and Dynamics)', *Schaum*

Series.

3. Beer and Johnston, 'Vector Mechanics for Engineers-Dynamics' *McGraw Hill Education.*

4. Engineering Mechanics (Statics and Dynamics)', Dorling Kindersley (India) Pvt. Ltd. *Pearson*

Education.

5. Dr. R. K. Bansal, Sanjay Bansal, 'A Text book of Engineering Mechanics', *Lakshmi publications.*

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ESC102 Basics of Electrical and Electronics Engineering

Teaching Scheme:
Lectures: 3 Hrs./Week
Credits: 3

Examination Scheme:
In-Semester: 50 Marks
End-Semester: 50 Marks

Course Objectives:

1. To educate the students about the realization of basic theoretical concepts & laws in electrical engineering in the real physical world.
2. To make students familiar with three phase supply.
3. To make students familiar with single phase transformers.
4. To understand the construction and applications of diode and BJT
5. To understand basics of combinational logic, Boolean algebra and flip -flops.

Course Outcomes:

After completion of course, students will be able to
CO1: Analyze and calculate parameters of DC circuits
CO2: Analyze and calculate parameters of AC circuits
CO3: Calculate performance parameters of single-phase transformer.
CO4: Analyze I-V characteristics of semiconductor diodes and transistors and design simple analog circuits using these devices
CO5: Build simple combinational and sequential logic circuits.

Unit I: DC Networks

Kirchhoff's laws, Mesh Analysis, Thevenin and Superposition Theorems, maximum power transfer theorem, Network Simplifications using star-delta / delta-star transformations.

Unit II: AC Circuits

Series and parallel RL, RC and RLC circuits, concept of Impedance and admittance, power triangle and power factor. Three phase voltage generation and waveform, star and delta balanced systems. Relationship between phase and line quantities, phasor diagram, power in a three-phase circuit.

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Unit III: Electromagnetism and Single-Phase Transformers

Statically and dynamically induced emfs, Self and mutual inductance, coefficient of coupling, 1 Φ transformer: concept, types, working, ideal transformer, practical transformer, equivalent circuit, phasor diagram, efficiency and regulation calculations.

Unit IV: Diodes and rectifiers

Construction and characteristic of p-n junction diode, Half wave, full wave and bridge rectifiers, need of capacitor filter, rectifier operation with capacitor filter, Zener diode as a voltage regulator, block diagram of Regulated power supply

Unit V: Junction Transistor Amplifiers

Bipolar junction transistor, Construction of BJT, Types of biasing: -fixed bias and self-bias circuit, BJT characteristics for-CE, CB,CC configurations, relationship between α and β, load line for a transistor, application of transistor as a switch and amplifier.

Unit VI: Digital Electronics

Basic gates, implementation of basic gates using universal gates, Boolean algebra, standard representation of logic functions (SOP and POS forms), Introduction of Combinational logic circuits like multiplexer, demultiplexer, half adder and full adder, Introduction of Sequential logic circuits like flip- flops (SR, D), counters and shift registers.

Textbooks:

1. Hughes, 'Electrical and Electronic Technology', Pearson education, (10th edition), (2008)

Reference Books:

1. D.P. Kothari and I.J. Nagrath, 'Basic Electrical Engineering', McGraw-Hill, (3rd edition), (2010)
2. A.E.Fitzgerald, A.Grabiel,'Basic Electrical engineering',McGraw-Hill, (5th edition), (2009)
3. Floyd, 'Electronic Devices and Circuits', pearson education, (7th edition), (2008)
4. AP Malvino & Donald Leach,'Digital Principles and Applications', McGraw Hill Education, (6 th edition), (2009)

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CC-102 Liberal Learning

Teaching Scheme: **Examination Scheme:**
Lecture : 1 Hrs/week   In semester : 50 marks
Practicals: 2 Hr/week
Credits : 2

Course Objectives:

1. To encourage the holistic development of students through art forms.

2. To develop life skills of the students through individual and group activities.

Note: Students will opt for any one of the following eleven modules. Each module is conducted for 12 sessions per semester.

Course Outcome For Module 1 to Module 9:

After completion of this course the students will be able to

CO1: Present the creative work through art forms.

CO2 : Demonstrate the ability to participate in teams.

Module 1: Culinary Arts

Planning a meal, Pre-cooking preparation, ingredients measurements, cleaning of vegetables, chopping and actual cooking.

Preparation and cooking continental dishes, sandwiches, donuts, mocktails, cookies, salads, wheat brownies etc.

Module 2: Dance

Warm up sessions, basic dance steps on Bollywood music, Zumba, folk dance, choreography.

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Module 3: Gardening

Fundamentals of gardening, projects like terrarium, kokedama, etc. knowledge of soil, fertilizers and seeds. Fundamentals of landscape designing.

Module 4: Painting

Indian art forms, viz. Warli, Madhubani, Mandala, and Dot Painting. Familiarity with a variety of materials, viz. acrylic, pencil, and watercolour paints.

Module 5: Theatre

Variety of exercises and activities such as improvisation, character development, scene work, vocal and physical warm-ups, script analysis, and feedback sessions. Technical aspects of theatre production such as lighting, sound, and set design.

Module 6: Film Appreciation

Introduction to film history and evolution of cinema, cinematic techniques: camera angles, lighting, and editing, film genres, role of directors in shaping cinematic vision, symbolism and motifs in cinema, the cultural and societal influences, Case studies of landmark films

Module 7: Mobile Movie Making

Introduction to Mobile Movie Making, Scripting, shooting, Five shot, Ten shot theory, Editing on Mobile, Dubbing on Mobile

Module 8: Creativity with LASERs

Introduction to basic LASER, Designing and editing text, Merging Shapes, Free hand design, Cutouts, Image processing and effects, various materials to be used on LASER machine, product costing

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Module 9: Anchoring and Public Speaking

Introduction to Public Speaking, 5 P's of speech, Introduction to Human Voice & Voice Modulations, Introduction and use of Microphone, Anchoring, Camera Facing, Event and discussion anchoring, Voice over techniques, Genres of anchoring.

Textbooks:

Culinary arts: "Theory of Cookery" by Krishna Arora, Macmillan Publishers

Dance: "Text book of Dance" by Gyanendra Dutt Bajpai, Kanishka Publisher

Gardening: "Gardening in India" 2nd Edition, by T K Bose, D Mukharjee, Oxford and IBH Publishers

Painting: "Panoramic Indian Painting" by R C Luthera, C K Luthera, Nidhi Sekhon Vishal Publishing Co.

Theatre: "Indian Theatre: Drama, Music and Dance" by Shovana Narayan, Shubhi Publishers.

Film Appreciation:

The Film Appreciation Book, by Jim Piper, Allworth Press, New York (2014)

Creativity with LASERs:

1. Solid State Engineering Vol-I – W. Koechner Springer Verlag (1976)

2. Lasers Fundamentals – W.T. Silfvast

3. Principles Of Lasers – O. Svelto – Plenum, 1982

4. Laser Parameters -- Heard

5. Laser and Non-Linear Optics – B.B. Laud (2nd Edition)

6. Lasers : Principles, Types and Applications -- K.R. Nambiar

7. Introduction to Fiber Optics – A.Ghatak, K.Thyagarajan- Cambridge University Press

8. Principles of Laser And Their Applications – Callen O'Shea, Rhodes

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Anchoring and Public Speaking:

1. "The Art of Public Speaking- Stephen E Luchas, Thirteen Edition, McGraw-Hill Education.
2. "Introductory Text Book of Linguistics and Phonetics"- Dr. S.K. Verma-Eighteenth Edition -Student Store Rampur Garden Bareilly.
3. "Effective Listening Skills" - Denis M Kratz, Abby Robinson Kratz- TATA McGraw-Hill Edition -2005

References: Online resources:

Culinary arts:

Kai Sean Lee, "Culinary aesthetics: World-traveling with culinary arts", Annals of Tourism research, 97 (23301) Nov 2022

Dance:

Malathi B, "Development of Dance in India", International Educational Applied Scientific Research Journal, Volume : 5 ¦ Issue : 1 ¦ Jan 2020

Gardening: Selma Lunde Fjaestad , Jessica L Mackelprang , Takemi Sugiyama "Mental health outcomes associated with gardening" July 2023, Book: Cultivated Therapeutic Landscapes (pp.104-130)

Painting: Maarit Anna Maleka, Tero Heinkkinen, Nithikul Nimkulrat "Drawing as a research tool: Making and understanding in art and design practice" article, February 2014, ResearchGate

Theatre: 1. Heli Aaltonen, Ellen Foyn Bruun, "Practice as research in drama and theatre: Introducing narrative supervision methodology:, July 2014, Nordic Journal of Art and Research

2. Dr.C.M.Vinay Kumar, Romesh Chaturvedi "Art of the Theatre on New Media Platform & Audience viewing experience", Global Media Journal-Indian Edition, Winter Issue December 2013

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Online Material:

Theatre:

Theatre and Stage Crafting, by Vinod Verma

Link for reference book: https://www.igntu.ac.in/eContent/BVoc-Media-06Sem-VinodVerma-%20Theatre%20and%20Stage%20Crafting.pdf

Film Appreciation:

Link for reference book: https://nibmehub.com/opac-service/pdf/read/The%20Film%20Appreciation%20Book%20_%20the%20film%20course%20you%20always%20wanted%20to%20take.pdf

Mobile Movie Making:

Online Material: Smartphone filmmaking Guide, by Bessie Young, MFA, MS

Link for Online Material : https://www.amwa-doc.org/wp-content/uploads/2020/05/Smartphone-Filmmaking-Guide.pdf

Module 10:   Yogasana

Course Objectives:

6. To enable the student to have good health.

7. To practice mental hygiene.

8. To possess emotional stability.

Course Outcomes:

After completion of the course, students will be able to

CO1: Demonstrate Flexibility and Mobility & Lung capacity through Practice of Asanas.

CO2: Practice Stress Management through Meditation & Mental wellbeing

CO3: Explain common Health Problems and their Remedies.

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Unit-I : Introduction – Yoga

Introduction - Preparatory Movements/ Loosening Exercise, Suryanamaskar

Science of Yoga and Breathing Techniques, Dwipad Uttanasana, Setubandhasana, Markatasana, Pawanmuktasana Kriya, Markatasana Variation,, Sarvangasana (Shoulder Stand), Bhujangasan, Salabhasana, Adho Mukha Svanasana, Naukasana, Padmasana Yog Mudra, Vajrasana Yog Mudra, Naukasana, Paschimottanasana, Akarna Dhanurasana, Vakrasana, Ardha Matsyendrasana, Tadasana , Vrikshasana , Virasana, Ugrasana , Trikonasana, Garudasana, Nataraj Asana.

Unit-II: Pranayam and Meditation

Preparation For Pranayam, Experience of Relaxation, Shuddhi Kriya- Kapalbhati, Deep Breathing, Fast Breathing (6 Types), Pranayam and Meditation, Anulom Vilom, Brahmari, Ujjayi, Meditation / Omkar, Dhyan

Reference Books:

1. Yoga Pravesh – Yogacharya Dr. Vishwas Mandlik.

2. Yoga Parichay – Yogacharya Dr. Vishwas Mandlik.

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Module 11 : German

Course Objectives:

1. To introduce the students to German language.

2. To make them aware of fundamental grammar concepts and basic vocabulary in German.

Course Outcomes:

After completion of the course, students will be able to

CO1: write short sentences in German

CO2: speak in short about themselves

CO3: answer comprehension questions by reading simple German texts

Unit-I : Initiation to the language

Alphabets, Numbers, Greetings, Exchanging name and place of stay & origine, contact information , Telling age

Unit-II: Self-introduction-I

Professions, Nationalities, Months & days , Telling birthday, Personal pronouns , Verbs – sein & haben

Unit-III: Self-introduction-II

Vocabulary related to family, Hobbies , Stationary objects , Definite & indefinite articles , Forming plural forms in German.

Textbook:

Tangram A1 (Einheiten 1 & 2)

Reference books:

Hilfe – A Unique Study Aid, *Inamdar Smita*

Basic Sciences and Humanities

BSC 102L Chemistry Lab

Teaching scheme: **Examination Scheme:**

Lab: 2H/week   In Sem: 25marks

Credits: 1

Course outcomes:

After completion of this course a student should be able to

CO1: Apply chemistry principles for quantitative analysis.

CO2: Make use of an instrument for chemical analysis.

CO3: Calculate chemical parameter based on recorded observations.

CO4: Evaluate the quality of coal based on its chemical properties.

CO5: Apply principles of electrochemistry for corrosion protection and mitigation

LIST OF EXPERIMENTS:

1. Determination of total hardness of sample water by EDTA Method.
2. Determination of total alkalinity of sample water.
3. Measuring EMF of electrochemical cells to predict spontaneity as well as to calculate Gibb's free energy and equilibrium constant.
4. Estimation of sodium from given solution using flame photometry.
5. Colorimetric estimation of Ferric ions in water.
6. Proximate analysis of coal samples.
7. Study the effect of temperature, pH and concentration of electrolyte on rate of corrosion for different metals.
8. Preparation of metallic coating on iron plate using electroplating principle.

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ESC102L Basics of Electrical and Electronics Engineering Lab

Teaching Scheme:	**Examination Scheme:**
Practical: 2 Hrs./Week	Term Work: 25 marks
Credits: 1	

Course Outcomes:

After completion of course, students will be able to
CO1: Develop basic wiring circuit using electrical components
CO2: Apply circuit laws to find the parameters of given electrical network
CO3: Build a basic regulated DC power supply
CO4: Obtain frequency response of CE amplifier
CO5: Build basic digital circuits

List of experiments:

1. Introduction of different electrical and electronics components and instruments.
2. To perform electrical wiring to control lamps using one way and two-way switches.
3. To verify Thevenin's theorem & superposition theorem.
4. To determine phase angle of L-C-R series circuit.
5. To perform load test on single phase transformer to determine regulation and efficiency.
6. To determine output voltage and ripple voltage of half wave, full wave rectifier with center tap transformer and bridge rectifier with and without filter.
7. Assemble and build simple DC regulated power supply.
8. To determine frequency response of CE amplifier.
9. Assemble and build half adder & full adder circuits.

VSEC201L Programming Skills in Python Language

Teaching Scheme:
Practical: 4 Hours/week
Credits: 2

Examination Scheme:

In Semester: 25 Marks

End Semester: 25 Marks

Prerequisites: Basic Mathematics.

Course Objectives:

Familiarize students with

1. The fundamentals of Python programming for logic building.

2. Appropriate data types, operators of Python language.

3. Conditional statements and loops in Python programming language.

4. List, strings, functions, and structures of Python programming language.

Course Outcomes:

Students will be able to:

1. Implement programs to solve real-life problems.

2. Implement Python programs using appropriate control structures, data type, operators and functions.

3. Execute Python programs.

4. Test Python programs for various inputs.

Suggested list of assignments:

1. Demonstration of installation and configuration of Anaconda and Spyder.

2. Accept and display class names and roll numbers of all the students from your class.

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3. Create an empty dictionary for the film database, add films to the dictionary, update the key value and display all details of films.

4. Create an empty list of districts. Insert districts of Maharashtra, append districts of Gujarat, extend districts of Kerala, search for specific districts, access the first 5 districts, remove any one district and display all districts.

5. A) Create an empty tuple of cricket player names. Add a few player names to the tuple and display all the players in the tuple.

B) Swap positions of two players using tuples and display the initial and swapped contents of the tuples.

6. Perform string manipulation functions (concatenation, substring, comparison, palindrome)

    a. Display your first name

    b. Concatenate your last name to first name

    c. Find substring "as" in your concatenated string

    d. Compare your first name with your friends first name and specify if it's same

    e. Check if following strings are palindrome or not

        i. Your first name

        ii. nitin

        iii. madam

        iv. noon

        v. Your friend's name.

7. Create a text file and add course outcomes of this course. Implement file operations on it.

8. Calculate area of the circular cricket ground for a given radius using:

   a. formula

   b. Inbuilt function from numpy library.

9. Plot sin(x) and cos(x) functions for values of x between 0 and pi. Use inbuilt libraries numpy and matplotlib.

10. Create a class named Person and assign values for name and age.

11. Implement a mini project based on String, function, directory, tuple and list.

Extra assignments:

1. Find out maximum and minimum salary of employee.

2. Calculate factorial using functions.

3. Generate fibonacci series using recursion.

4. Print multiplication table from 1 to 10

5. Design a two-player Rock-Paper-Scissors game

6. Python program to draw a circle of squares using Turtle
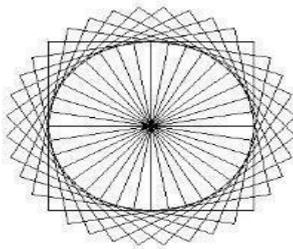
7. Generate a random number between 1 and 9 (including 1 and 9). Ask your friend to guess the number, then tell them whether they guessed too low, too high, or exactly right.

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8. The company gives a dearness allowance 45% of basic salary and house rent allowance is 25% of basic salary. Write a python program to calculate gross salary.

Text books:

1. Reema Thareja, "Python Programming using problem solving Approach", Oxford University, Higher Education Oxford University Press; First edition (10 June 2017), ISBN-10: 0199480173

2. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Interdisciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016.

3. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and Updated for Python 3.2", Network Theory Ltd., 2011.

Reference Books:

1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016

(http://greenteapress.com/wp/think- python/)

2. Michael B. Feldman and Elliot B. Koffman. "Ada95: Problem Solving and Program Design", Addison-Wesley, Reading, Massachusetts, 1996.

3. Fredrik Johansson et al., "Mpmath: A Python library for Arbitrary-Precision Floating Point Arithmetic", December 2013. http://mpmath.org/.

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