

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
B.E. in Agricultural Engineering
Scheme of Teaching and Examinations 2022
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2023-24)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC/BSC	BAG301	Basics Concepts and Applications of Agrochemicals	TD-PSB	3	0	0		03	50	50	100	3
2	IPCC	BAG302	Fundamentals of Agriculture & Crop Production Technology	TD: PSB	3	0	2		03	50	50	100	4
3	IPCC	BAG303	Soil Mechanics, Surveying & Levelling	TD: PSB	3	0	2		03	50	50	100	4
4	PCC	BAG304	Mechanics of Materials & Machine	TD: PSB	3	0	0		03	50	50	100	3
5	PCCL	BAGL305	Basic Workshop Practise Lab	TD: PSB	0	0	2		03	50	50	100	1
6	ESC	BAG306x	ESC/ETC/PLC	TD: PSB:	3	0	0		03	50	50	100	3
7	UHV	BSCK307	Social Connect and Responsibility	Any Department	0	0	2		01	100	---	100	1
8	AEC/ SEC	BAG358x	Ability Enhancement Course/Skill Enhancement Course - III		If the course is a Theory				01	50	50	100	1
				1	0	0							
					If a course is a laboratory				02				
				0	0	2							
9	MC	BNSK359	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		BPEK359	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		BYOK359	Yoga	Yoga Teacher									
Total									550	350	900	20	

PCC: Professional Core Course, **PCCL:** Professional Core Course laboratory, **UHV:** Universal Human Value Course, **MC:** Mandatory Course (Non-credit), **AEC:** Ability Enhancement Course, **SEC:** Skill Enhancement Course, **L:** Lecture, **T:** Tutorial, **P:** Practical **S= SDA:** Skill Development Activity, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation. **K:** This letter in the course code indicates common to all the stream of engineering. **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course

Engineering Science Course (ESC/ETC/PLC)

BAG306A	Information Technology for Land and Water Management	BAG306C	Analog and Digital Electronics Circuit
BAG306B	Artificial Intelligence and Machine learning	BAG306D	Solid Waste And By-Product Utilization

Ability Enhancement Course – III

BAGL358A	Advanced Python Programming [0-0-2]	BAGL358C	Spreadsheet for Engineers [0-0-2]
BAG358B	Fundamentals of Virtual Reality [0-2-0]	BAGL358D	Tools in Scientific Computing [0-0-2]

Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practicals of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23 may please be referred.

National Service Scheme /Physical Education/Yoga: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.


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Basics Concepts and Applications of Agrochemicals		Semester	III
Course Code	BAG301	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination nature (SEE)	Theory		
Course Objectives: • To understand the basic concepts of agrochemicals and their applications in agriculture. • To study naturally occurring and synthetic chemical agents used for protecting crops in field as well as in storage. • To understand the role of naturally occurring crop protecting chemical agents in fostering organic farming. • To understand the impact of agrochemicals on environmental, animal, and human health • To understand the regulatory mechanism of agrochemicals at national and international levels • To acquire necessary basic knowledge on agrochemicals so as to evolve engineering strategy for their optimal and judicial applications in field as well as storage conditions, based on integrated learning outcomes from other courses.			
Teaching-Learning Process (General Instructions) These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes. 1. Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Video demonstrations or Simulations. 2. Chalk and Talk method for teaching basic concepts. 3. Arranging visits to farmers' fields to expose pupils to real time farming situations. 4. Adopt collaborative (Group Learning) Learning in the class. 5. By giving assignments and presentation tasks to students. Exploring information from research publications and regulatory documents			
Module-1			
Naturally Occurring Crop Protection Agents Economic loss of agricultural produce due to pest problems: insects, diseases, rodents and weeds; Sources and utility of naturally occurring insecticides, bactericides, fungicides, nematocides, rodenticides; Role of naturally occurring pesticides in fostering organic farming; Working principles of botanical insecticides such as natural pyrethroids, nicotine, rotenone, neem and karanj; Pest control properties of plant hormones, phytoalexins and essential oils; Advantage and limitations of naturally occurring crop protection agents; juvenile hormones (JH), juvenile hormone mimics and anti-JH; chemosterilants, insect antifeedants, insect attractants and repellents; microbial pesticides and biocontrol agents.			
Module-2			
Synthetic Crop Protection Agents History, scope and principles of chemical insect control; Synthetic insecticides, bactericides, fungicides, nematocides, rodenticides, weedicides; Classification of major groups of insecticides (organo-chlorine, organo-phosphorus, organo-carbamates, synthetic pyrethroids, neonicotinoids), fungicides (inorganics, dithiocarbamates, OP's, phenols, quinines, carboxamides, azoles, methoxyacrylates); Mode of action of different groups of insecticides, fungicides and nematocides; Chitin synthesis inhibitors, insecticide synergists, and fumigants; Plant growth regulators – auxins, gibberellins, cytokinins, ethylene, abscisic acid; Brassinolides;			
Module-3			
Chemicals used for storage and preservation Major storage pests of economic importance causing damage during storage of food grains; Strategies involving storage bags, storage structures, and storage conditions; Pesticides and fumigants used in controlling insects and rodents during storage; Chemicals used for preserving freshness and promoting ripening in vegetables and fruits, respectively			
Module-4			

Agrochemical Formulations

Basic concepts of pesticide formulation - classification, solid and liquid formulations; preparation, properties, uses; controlled release formulations; Formulants - carriers/ diluents, surfactants, encapsulants, binders, anti-oxidants, stabilizers; Application - devices and quality of deposits; Types of spray appliances, seed treatment and dressing; nanotechnology in crop protection, Tools to develop and measure nanoparticles. Basic concepts of fertilizer formulations: enhancing fertilizer use efficiency and reducing environmental pollutions

Module-5**Agrochemicals – Regulation and Quality Control**

Production, consumption and trade statistics of pesticides and fertilizers; banned and restricted pesticides, registration and quality control of insecticides; Laws, Acts and Rules governing registration and regulations of agrochemical production and use; key provisions of the Insecticides Act (1968), Environmental Protection Act (1986). Food Safety and Standards Act, WHO, FAO, CODEX and national/international guidelines.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

- Understand the basic concepts of agrochemicals and their applications in agriculture.
- Understand naturally occurring and synthetic chemical agents used for protecting crops in field as well as in storage.
- Understand the role of naturally occurring crop protecting chemical agents in fostering organic farming.
- Understand the impact of agrochemicals on environmental, animal, and human health
- Understand the regulatory mechanism of agrochemicals at national and international levels
- Acquire necessary basic knowledge on agrochemicals so as to evolve engineering strategies for their optimal and judicious applications in field as well as storage conditions, based on learning outcomes from other courses

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored shall be proportionally reduced to 50 marks

Suggested Learning Resources:**Books**

1. **"Agrochemicals and Pest Management"** by T.V. Sathe. Daya Publishing House (2003)
ISBN: 8170353092, 9788170353096
2. **"Agrochemicals and Sustainable Agriculture"** By N.K. Roy. Associated Publishing Company (2021).
ISBN: 9788186580110
3. **"Sittig's Handbook of Pesticides and Agricultural Chemicals"** Edited By Stanley A. Greene and Richard P. Pohanish. Elsevier (2005). ISBN: 978-0-8155-1516-6
4. **"Agrochemicals"** By Singh Ranjit. LAP Lambert Academic Publishing. ISBN: 9786139851997
5. **"The Complete Technology Book on Pesticides, Fungicides, Herbicides (Agrochemicals) with Formulae, manufacturing Process, Machinery and Equipment Details"** By Himadri Panda. 2nd Revised Edition. Published by NIIR Project Consultancy Services (2022), ISBN: 9788195577538
6. **"A textbook of Fertilizers"** By Deepak Ranjan Biswas. New India Publishing Agency, New Delhi.
"Pesticide Regulation Handbook" By Greene Jan. Taylor and Francis Ltd, ISBN: 9781315896366, 9781315896366

Web links and Video Lectures (e-Resources):**Activity Based Learning (Suggested Activities in Class)/ Practical Based learning**

- Quizzes
- Assignments
- Seminars


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FUNDAMENTALS OF AGRICULTURE & CROP PRODUCTION TECHNOLOGY (IPCC)		Semester	III
Course Code	BAG302	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	3
Examination nature (SEE)	Theory		
Course objectives: • Imparting knowledge on different crops, crop nutrition and growth • Describing crop-water relations in association to crop growth and development • Illustrating crop management, cropping pattern and weed management • Imparting the fundamentals of crop production technology of crops • Providing knowledge on the importance and practices followed in growing crops			
Teaching-Learning Process (General Instructions) These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes. 1. Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Videodemonstrations or Simulations. 2. Chalk and Talk method for Problem Solving. 3. Arrange visits to show the live working models other than laboratory topics. 4. Adopt collaborative (Group Learning) Learning in the class. 5. Adopt Problem Based Learning (PBL), which fosters students Analytical skills and develops thinking skills such as evaluating, generalizing, and analysing information. 6. Conduct Laboratory Demonstrations and Practical Experiments to enhance experiential skills.			
MODULE-1 Agronomy, its definition, scope and role of Agronomist. Tillage-objectives of tillage, types of tillage, tillage implements and factors affecting tillage, Effect of tillage on soil and crop growth. Tillage: its definition, characteristics and ideal tillage, Modern concepts of tillage, minimum, zero and stubble mulch tillage, importance of puddling. Conventional tillage practices and their effects, modern tillage practices and their advantages;			
MODULE-2 Seed, its definition, characteristics of quality seed, seed treatment and its objectives. Seed dormancy, causes of seed dormancy and multiplication, stages of seed. Effect of plant population on growth and yield, Planting geometry viz., solid, paired and skipped row planting. Importance of manures and fertilizers and its classification. Methods and time of application of manures, fertilizers and green manuring. Nutrient use efficiency and factors affecting nutrient use efficiency. Scheduling of Irrigation and Fertilizers: Irrigation schedules for different crops in different soils and agro-climatic regions, fertigation, irrigation methods. Plant Protection Measures- Pesticides, types of weedicides and insecticides available to control different weed flora, pests and diseases and their mode of action.			
MODULE-3 Weeds, its definition, characteristics of weeds, merits and demerits of weeds, classification of weeds, meaning of crop weed competition and its period in different crops. Principles and methods of weed management viz., cultural, mechanical, chemical, biological weed control methods and integrated weed management. Classification of herbicides. Crop harvesting, signs of maturity in different field crops, Physiological and crop maturity, Method of harvesting.			
MODULE-4 Introduction: Concepts in crop production; geographical distribution of crops and cropping systems; economic importance. Crop Classification: Cereals, pulses, oilseeds, fiber crops, forage crops, medicinal and aromatic crops and horticultural crops. Cropping Systems for Major Agro-Ecological Regions: Detailed descriptions of rice based cropping			

systems, sugarcane based cropping systems, cotton based cropping systems, pulses and oilseeds based cropping systems, their suitability in different agro-ecological regions. Crop rotation, its definition, principles and advantages of crop rotation.
MODULE-5
Modern Techniques of Raising Field and Horticultural Crops Techniques of nursery raising, method of planting, fertilization, irrigation scheduling, weed control, and other practices to optimize yield, economic evaluations. Crop Growth Assessment: Crop, growth parameters and their measurements.

PRACTICAL COMPONENT OF IPCC(May cover all / major modules)

Sl.NO	Experiments
1	Identification of crops, seeds, fertilizers, pesticides & Tillage implements
2	Effect of sowing depth on germination and seedling vigour
3	Study of yield contributing characters and yield estimation
4	Seed germination and viability test
5	Numerical exercises on fertilizer requirement
6	Plant Population and water requirement
7	Use of tillage implements (reversible plough, one way plough, harrow, leveller, seed drill)
8	Study of soil moisture measuring devices
9	Measurement of field capacity, bulk density and infiltration rate
10	Measurement of irrigation water
11	Study of crop varieties and agronomic experiments at experimental farm
12	Morphological description of Kharif season crops (rice).

Course outcomes (Course Skill Set):

At the end of the course, the student will be able to:

- Express knowledge gained on the principles of agronomy
- Recognize the various nutrients and their effects on plant health
- Plan irrigation measures for plant growth and development
- Manage weeds in a field
- Plan for sustainable agricultural production
- Apply scientific methods and tools in field preparation and for designing cropping
- Comprehend the fundamentals of crop production of cereals
- Decide on the crops, fertilizers and irrigation measures for production of pulses
- Plan for sustainable crop production of oilseeds
- Explain the techniques involved in crop production of fibre and forage crops
- Correlate parameters involved in crop cultivation and practices of crop cultivation

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be

deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (**duration 02/03 hours**) after completion of all the experiments shall be conducted for 50 marks and scaled down to **10 marks**.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

5. The question paper will have ten questions. Each question is set for 20 marks.
6. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
7. The students have to answer 5 full questions, selecting one full question from each module.
8. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Suggested Learning Resources:

Books

1. Crop production and field experimentation by V.G. Vaidya, K.R. Sahastrabudhe and V.S. Khuspe. ContinentalPrakashan, Vijaynagar, Pune.
2. Hand book of Agriculture, ICAR Publication.
3. Modern techniques of raising field crops by Chidda Singh. Oxford and IBH Publishing Co. Ltd., Bangalore.
4. Principles of Agronomy by Sankaran S. and V.T. SubbiahMudliyar, 1991. The Bangalore Printing and Publishing Co.Ltd., Bangalore.
5. Agronomy by S.C. Panda, 2006. Agribios Publication, New Delhi.
6. Crop Production and Management by Y.B. Moranchan. Oxford and IBH Publishing Co. Ltd., Bangalore.
7. Principles of Agronomy by S.R. Reddy, Kalyani Publishers, Ludhiana, India.
8. Principles of Crop Production by Martin J.H. and Leonard W.H. the Mac Million Company, New York – 1962.
9. Scientific Crop Production (Vol. I and II). Thakur C. Metropolitan Books Co. Pvt. Ltd., New Delhi.
10. Fundamentals of Agronomy. Gopal Chandra De. 1980. Oxford and IBH Publishing Co. Ltd., Bangalore
11. Singh, Chidda "Modem technique of raising of field crops". Oxford and IBH Publishing Company Pvt. Ltd., 1994.
12. Suresh Singh Tomar, YagyaDev Mishra and Shailendra Singh Kushah. 2018. Production Technology of Rabi Crops.Biotech books, New Delhi, India.
13. Rajendra Prasad. 2017. Textbook of field crops production, Volume 1 and 2 (Foodgrain crops & Commercial Crops).ICAR, India.
14. ingh, R.P., Reddy, P.S. and Kiresur, V.(eds.). "Efficient Management of Dryland Crops in India". Indian Society ofOilseed Research, DOR Rajendra Nagar, Hyderabad, 1997.
15. Joshi M. 2015. Textbook of Field Crops. Prentice Hall India Learning Private Limited, India.

Web links and Video Lectures (e-Resources):

<https://www.youtube.com/watch?v=AnnZFYXnlfw>

https://www.youtube.com/watch?v=8ulpy_GFLDk

<https://www.youtube.com/watch?v=NCp93xbSwWM>

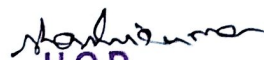
<https://www.youtube.com/watch?v=60qVUwLP1s8>

<https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-chapter8-1.pdf>

<https://ecourses.icar.gov.in/>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quizzes
- Assignments
- Seminars
- Field Experiments
- Mini Projects


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Soil Mechanics, Surveying & Levelling		Semester	III
Course Code	BAG303	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40 hours Theory + 8-10 Lab slots	Total Marks	100
Credits	04	Exam Hours	3
Examination nature (SEE)	Theory		
Course objectives: • Appreciate basic concepts of soil mechanics as an integral part • Comprehend basic engineering and mechanical properties of different types of soil. • Model and measure strength-deformation characteristics of soils • Familiar with Soil mechanics problems such as flow through soils • Study about assessing stability of slopes and earth pressure on rigid retaining structures • Understand the basic principles of Surveying • Learn Linear and Angular measurements to arrive at solutions to basic surveying problems. • Employ conventional surveying data capturing techniques and process the data for computations. • Analyze the obtained spatial data to compute areas and volumes and draw contours to represent 3D data on plane figures.			
Teaching-Learning Process (General Instructions) These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes. 1. Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Video demonstrations or Simulations. 2. Chalk and Talk method for Problem Solving. 3. Arrange visits to show the live working models other than laboratory topics. 4. Adopt collaborative (Group Learning) Learning in the class. 5. Adopt Problem Based Learning (PBL), which fosters students Analytical skills and develops thinking skills such as evaluating, generalizing, and analyzing information. 6. Conduct Laboratory Demonstrations and Practical Experiments to enhance experiential skills			
MODULE-1			
Engineering Properties of Soils -Water content; Unit weight of soil; Specific gravity; Void ratio; Porosity; Degree of saturation; Functional relationships; Determination of index properties; Liquid limit; Plastic limit; Shrinkage limit; Plasticity index; Particle size distribution curve. Classification of Soils and Clay Mineralogy- Particle size classification; Textural classification; Indian standards classification; Soil structure; Soil Hydraulics -Modes of occurrence of water in soils; Stress condition in soil; Permeability; Factors affecting permeability; Laboratory and field methods of determining permeability coefficients. Elasticity Applied to Soils- State of stress at a point; Strain components; Stress distribution; Pressure distribution diagrams; Newmark's influence charts; Contact pressure; Principal stresses and maximum shear. Compression and Compressibility			
MODULE-2			
Strength and Stability-Shear strength; Mohr circle of stresses; Measurement of shear strength; direct shear tests; Tri-axial compression test; Unconfined compression test; vane shear test; Pore pressure parameters; Active and passive earth pressures; Stability of slopes; Taylors stability number and stability curves; Bearing Capacity of Soil; Rankine analysis; Terzaghi analysis; General and local shear failure; Mayerhoeff's analysis; Effect of water table on bearing capacity; Stabilization of Soil and Site Investigation-Introduction; Method of Stabilisation; Site exploration; Depth of exploration; Methods of site exploration; Soil samples and samplers.			
MODULE-3			
INTRODUCTION: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications. Distance measurement conventional symbols and methods; use of chain and tape, Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle. LEVELING AND CONTOURING: Concept and Terminology, Temporary and permanent adjustments method of leveling. Contouring: Contours, Methods of contouring, Interpolation of contours, contour gradient, characteristics of contours and uses.			

MODULE-4	
COMPUTATION OF AREAS AND VOLUMES: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.	
THEODOLITE & TACHEOMETRIC SURVEYING	
Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling, Traversing. Stadia and tangential methods of Tacheometry.	
MODULE-5	
INTRODUCTION TO ADVANCED SURVEYING: Introduction to geodetic surveying, Total Station and Global positioning system, Introduction to Geographic information system (GIS) & Modern Instruments and its applications. Modern Surveying Instruments Introduction, Electromagnetic spectrum, Electromagnetic distance measurement, Total station, Lidar scanners for topographical survey.	
Aerial Photogrammetry Introduction, Uses, Aerial photographs, Definitions, Scale of vertical and tilted photograph (simple problems), Ground Co-ordinates (simple problems), Relief Displacements (Derivation).	

PRACTICAL COMPONENT OF IPCC (May cover all / major modules)

Sl.NO	Experiments
1	Special gravity of soil solids
2	Grain size distribution
3	Atterberg Limits
4	Field density Test (Sand replacement method)
5	Permeability determination (constant head and falling head methods)
6	Direct shear test in cohesion-less soil
7	Unconfined compression test in cohesive soil
8	a) Measurements of distances using tape along with horizontal planes and slopes, direct ranging. b) Setting out perpendiculars. Use of cross staff, optical square.
9	Measurements of bearings / directions using prismatic compass, setting of geometrical figures using prismatic compass.
10	Determination of reduced levels of points using dumpy level/auto level (differential leveling and inverted leveling).
11	To conduct profile leveling, cross sectioning and block leveling. Plotting profile and cross sectioning in excel. Block contour on graph paper to scale.
12	Measurement of horizontal angle by repetition and reiteration methods
13	Determination of horizontal distance to a base in accessible object using theodolite by single plane and double plane method.
14	To determine distance and elevation using tachometric surveying with horizontal and inclined line of sight.
15	Demonstration of Minor instruments like Clinometer, Ceylon Ghat Tracer, Box sextant, hand Level, Digital Planimeter and Pentagraph

Course outcomes (Course Skill Set):

At the end of the course, the student will be able to:

- Acquire an understanding of the procedures to determine properties of any type of soil, classify the soil based on its index properties.
- Able to determine permeability property of soils and acquires conceptual knowledge about stresses due to seepage and effective stress.
- Able to estimate seepage losses across hydraulic structures.
- Able to estimate shear strength parameters of different types of soils using the data of different shear tests and comprehend Mohr-Coulomb failure theory
- Ability to solve practical problems related to bearing capacity
- Able to plan and execute geotechnical site investigations for Hydraulic structures
- Possess a sound knowledge of fundamental principles Geodetics
- Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
- Capture geodetic data to process and perform analysis for survey problems]
- Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CIE for the theory component of the IPCC (maximum marks 50)

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are **25 marks** and that for the practical component is **25 marks**.
- 25 marks for the theory component are split into **15 marks** for two Internal Assessment Tests (Two Tests, each of 15 Marks with 01-hour duration, are to be conducted) and **10 marks** for other assessment methods mentioned in 22OB4.2. The first test at the end of 40-50% coverage of the syllabus and the second test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for **25 marks**).
- The student has to secure 40% of 25 marks to qualify in the CIE of the theory component of IPCC.

CIE for the practical component of the IPCC

- **15 marks** for the conduction of the experiment and preparation of laboratory record, and **10 marks** for the test to be conducted after the completion of all the laboratory sessions.
- On completion of every experiment/program in the laboratory, the students shall be evaluated including viva-voce and marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report. Each experiment report can be evaluated for 10 marks. Marks of all experiments' write-ups are added and scaled down to **15 marks**.
- The laboratory test (**duration 02/03 hours**) after completion of all the experiments shall be conducted for 50

marks and scaled down to **10 marks**.

- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for **25 marks**.
- The student has to secure 40% of 25 marks to qualify in the CIE of the practical component of the IPCC.

SEE for IPCC

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**)

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
3. The students have to answer 5 full questions, selecting one full question from each module.
4. Marks scored by the student shall be proportionally scaled down to 50 Marks

The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only. Questions mentioned in the SEE paper may include questions from the practical component.

Suggested Learning Resources:

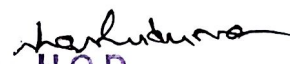
Books

1. Soil Mechanics and Foundation Engineering Murthy, V.N.S UBS Publishers and Distributors, New Delhi. 1996
2. Soil Mechanics and Foundation Punmia, B.C New Delhi STD Book House, 1987 2017
3. Basic and Applied Soil Mechanics Gopalrajan and Rao, A.S.R. New Age International (P) Ltd., New delhi. 2000
4. Soil Mechanics T.W. Lambe and R.V. Whitman John Wiley & Sons. 1969
5. Geotechnical Engineering Donald P Coduto Phi Learning Private Limited, New Delhi.
6. Surveying (Vol – 1, 2 & 3) B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain Laxmi Publications (P) Ltd., NewDelhi
7. Surveying (Vol – 1 & 2) Duggal S K Tata Mc-Graw Hill Publishing Co. Ltd New Delhi 2004
8. Elements of Plane Surveying Arthur R Benton and Philip J Taety McGraw Hill 2000
9. Surveying Vol 1, 2 & 3 Arora K R Standard Book House, Delhi, 2004

Web links and Video Lectures (e-Resources):

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quizzes
- Assignments
- Seminars
- Field Experiments
- Mini Projects


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Mechanics of Materials & Machine		Semester	III
Course Code	BAG304	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Examination nature (SEE)	Theory		
Course objectives: - To learn about simple stresses and strains and their applications. - To learn how to find shear force and bending moment and construction of SFD & BMD - To understand the concept of machines, mechanisms and to analyze a mechanism for displacement, velocity and acceleration at any point in a moving link. - To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms - To understand the theory of gears and gear trains.			
Teaching-Learning Process (General Instructions) These are sample strategies, which teachers can use to accelerate the attainment of the various course outcomes. - Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Videodemonstrations or Simulations. - Chalk and Talk method for Problem Solving. - Adopt flipped classroom teaching method. - Adopt collaborative (Group Learning) learning in the class. - Adopt Problem Based Learning (PBL), which fosters students' analytical skills and develops thinking skills such as evaluating, generalizing, and analysing information.			
Module-1			
Simple Stresses and Strains: Elasticity and plasticity – Types of stresses and strains – Hooke's law – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them			
Module-2			
Shear Force and Bending Moments: Types of supports – Types of beams – Shear force and bending moment diagrams for simply supported - Cantilever and over hanging beams with point loads, uniformly distributed load, uniformly varying loads and couples – Relationship between shear force and bending moment.			
Module-3			
Introduction: Mechanisms and machines, Kinematic pairs-types, degree of freedom, Kinematic chains and their classification, Kinematic inversions, Velocity and Acceleration analysis of planar mechanisms Graphical method: Velocity and Acceleration Analysis of Mechanisms Velocity and acceleration analysis of four bar mechanism, slider crank mechanism.			
Module-4			
Static force analysis: Static equilibrium, analysis of four bar mechanism, slider crank mechanism. Dynamic force analysis: D'Alembert's principle, analysis of four bar and slider crank mechanism. Flywheel: Introduction to Flywheel and calculation of its size for simple machines like punching machine, shearing machine Spur Gears: Gear terminology, law of gearing, path of contact, arc of contact, contact ratio of spur gear. Gear Trains: Simple gear trains, compound gear trains. Epicyclic gear trains.			
Module-5			
MACHINE DESIGN – Definition, Classification of machine design, General considerations in machine design, General procedure in machine design. Fundamental units, Mass and Weight, inertia, laws of motion, force, moment of force, couple mass density, torque, work, power and energy. LEVERS – Introduction, application of levers in			

engineering practice, design of lever hand levers, foot lever, and cranked lever. Springs – Introduction, types of springs, material for helical springs, spring wire, terminology

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

1. The students would be able to understand the behaviour of materials under different stress and strain conditions.
2. Knowledge of mechanisms and their motion and the inversions of mechanisms
3. Analyse the mechanisms for static and dynamic equilibrium.
4. Carry out the balancing of rotating and reciprocating masses
5. Analyse different types of governors used in real life situation.
6. Various basic terms related to machine design aspect

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (**duration 03 hours**).

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored shall be proportionally reduced to 50 marks

Suggested Learning Resources:

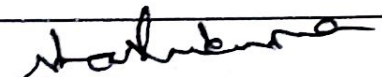
Books

1. R.S. Khurmi, Theory of Machines, Khanna Publishers, 2003.
2. S. S. Ratan, Theory of Machines, Tata McGraw Hill, 2nd Edition, 2005
3. Ghosh A. and Mallick A.K, Theory of Mechanisms and Machines, Affiliated East-West Press, 2nd Edition, 1988.
4. Thomas Bevan, Theory of Machines, CBS Publishers, 3rd Edition, 1984
J.S Rao. & R.V Dukkupati, Mechanism and Machine Theory, Newagepublishers, 2nd edition 1992

Web links and Video Lectures (e-Resources):

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quizzes
- Assignments
- Seminars


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BASIC WORKSHOP PRACTICE LAB		Semester	III
Course Code	BAGL305	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	(0:0:2:0)	SEE Marks	50
Credits	01	Exam Hours	03
Examination nature (SEE)	Practical		
Course objectives: - To identify tools, work material and measuring instruments useful for fitting, carpentry, Sheet metal working and Smithy practice - To handle tools and instruments and use them to prepare joints of specific shape and size			
Sl.NO	Experiments		
1	Fitting: Introduction, Various tools used in fitting shop- Holding tools; Marking and Measuring tools; Striking tools; Cutting tools; finishing tools		
2	Preparation of Square fitting model in fitting shop		
3	Preparation of V fitting model in fitting shop		
4	Carpentry: Introduction, Timber, classification and characteristics; Various tools used in carpentry shop- Holding tools; Marking and Measuring tools; Striking tools; Planing tools; Cutting tools – saws and chisels		
5	Preparation of T-Lap joint model in Carpentry shop		
6	Preparation of Dove-tail Lap joint model in Carpentry shop		
7	Sheet metal working: Introduction, Sheet metals used in metal work; Various tools used- Holding tools; Marking and Measuring tools; Striking tool – hammers and mallets; Snips; Stakes		
8	Preparation of Open scoop model in Sheet metal shop		
Demonstration Experiments (For CIE)			
9	Preparation of Rectangular tray model in Sheet metal shop		
10	Smithy: Introduction, Principle of forging; Various tools used- Holding tools; Marking and Measuring tools; Striking tool – hammers; Flatters; Swage block; V-Block; Tongs, etc		
11	To prepare S-Hook from a given round rod		
12	To make a square rod from a given round rod		
Course outcomes (Course Skill Set): At the end of the course the student will be able to: - To select suitable tools and equipment to prepare joints using bench-work tools. - To produce joints using materials of specific shape and size by a suitable PO1, PO3, PO5, PS01, set of operations and check the accuracy of shape and dimensions using suitable measuring tools..			

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation (CIE):

CIE marks for the practical course are **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.
- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.

- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.

The minimum duration of SEE is 02 hours


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Suggested Learning Resources:

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Dept. of Agricultural Engineering
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Artificial Intelligence and Machine learning		Semester	III
Course Code	BAG306B	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination nature (SEE)	Theory		
Course objectives: 1. Understands the basics of AI, history of AI and its foundations, basic principles of AI for problem solving 2. Explore the basics of Machine Learning & Machine Learning process, understanding data 3. Understand the Working of Artificial Neural Networks			
Teaching-Learning Process (General Instructions) These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes. 1. Lecturer method (L) need not to be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. 2. Use of Video/Animation to explain functioning of various concepts. 3. Encourage collaborative (Group Learning) Learning in the class. 4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking. 5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 6. Introduce Topics in manifold representations. 7. Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them. 8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.			
Module-1			
Introduction: What is AI, The foundation of Artificial Intelligence, The history of Artificial Intelligence, Intelligent Agents: Agents and Environments, Good Behaviour: The concept of rationality, the nature of Environments, the structure of Agents			
Module-2			
Problem solving by searching: Problem solving agents, Example problems, Searching for solutions, Uniformed search strategies, Informed search strategies, Heuristic functions			
Module-3			
Introduction to machine learning: Need for Machine Learning, Machine Learning Explained, and Machine Learning in relation to other fields, Types of Machine Learning. Challenges of Machine Learning, Machine Learning process, Machine Learning applications. Understanding Data: What is data, types of data, Big data analytics and types of analytics, Big data analytics framework, Descriptive statistics, univariate data analysis and visualization			
Module-4			
Understanding Data: Bivariate and Multivariate data, Multivariate statistics, Essential mathematics for Multivariate data, Overview hypothesis, Feature engineering and dimensionality reduction techniques. Basics of Learning Theory: Introduction to learning and its types, Introduction computation learning theory, Design of learning system, Introduction concept learning. Similarity-based learning: Introduction to Similarity or instance based learning, Nearest-neighbour learning, weighted k- Nearest - Neighbour algorithm.			

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Module-5
Artificial Neural Network: Introduction, Biological neurons, Artificial neurons, Perceptron and learning theory, types of Artificial neural Network, learning in multilayer Perceptron, Radial basis function neural network, self-organizing feature map.
Course outcome (Course Skill Set) At the end of the course the student will be able to: 1. Design intelligent agents for solving simple gaming problems. 2. Have a good understanding of machine learning in relation to other fields and fundamental issues and Challenges of machine learning 3. Understand data and applying machine learning algorithms to predict the outputs. 4. Model the neuron and Neural Network, and to analyze ANN learning and its applications.
Assessment Details (both CIE and SEE) The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Continuous Internal Evaluation: • For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks. • The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered • Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned. • For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment. Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.
Semester-End Examination: Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the course (duration 03 hours). • The question paper will have ten questions. Each question is set for 20 marks. • There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. • The students have to answer 5 full questions, selecting one full question from each module. • Marks scored shall be proportionally reduced to 50 marks
Suggested Learning Resources: Textbooks: 1. Stuart Russel, Peter Norvig: "Artificial Intelligence A Modern Approach", 3rd Edition, Pearson Education, 2015. 2. S. Sridhar, M Vijayalakshmi "Machine Learning". Oxford ,2021 Reference books: 1. Elaine Rich, Kevin Knight: "Artificial Intelligence", 3rd Edition, Tata McGraw Hill, 2009, ISBN-10: 0070087709 2. Nils J. Nilsson: "Principles of Artificial Intelligence", Elsevier, 1980, ISBN: 978-3-540-11340-9.

Web links and Video Lectures (e-Resources):

<http://stpk.cs.rtu.lv/sites/all/files/stpk/materiali/MI/Artificial%20Intelligence%20A%20Modern%20Approach.pdf>.

1. <http://www.getfreebooks.com/16-sites-with-free-artificial-intelligence-e-books/>https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_overview.htm
2. Problem solving agent:<https://www.youtube.com/watch?v=KTPmo-KsOis>.
3. https://www.youtube.com/watch?v=X_Qt0U66aH0&list=PLwdnzlV3ogoXaceHrrFVZCJkbm_laSHcH
4. <https://www.javatpoint.com/history-of-artificial-intelligence>
5. <https://www.tutorialandexample.com/problem-solving-in-artificial-intelligence>
6. <https://techvidvan.com/tutorials/ai-heuristic-search/>
7. <https://www.analyticsvidhya.com/machine-learning/>
8. <https://www.hackerearth.com/practice/machine-learning/machine-learning-algorithms/mldecision-tree/tutorial/>
9. <https://www.javatpoint.com/unsupervised-artificial-neural-networks>


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Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Real world problem solving: Demonstration of projects related to AI and ML.

Dept. of Agricultural Engineering
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Advanced Python Programming [0-0-2]		Semester	III
Course Code	BAGL358A	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	0:0:2:0	SEE Marks	50
Total Hours of Pedagogy	30	Total Marks	100
Credits	01	Exam Hours	01
Examination nature (SEE)	Practical		
Course objectives: - To understand why Python is a useful scripting language for developers - To read and write simple Python programs - To learn how to identify Python object types. - To learn how to write functions and pass arguments in Python. - To use Python data structures -- lists, tuples, dictionaries.			
Teaching-Learning Process (General Instructions) These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes. - Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Videodemonstrations or Simulations. - Chalk and Talk method for Problem Solving. - Adopt flipped classroom teaching method. - Adopt collaborative (Group Learning) learning in the class. - Adopt Problem Based Learning (PBL), which fosters students' analytical skills and develops thinking skills such as evaluating, generalizing, and analysing information.			
Module-1			
INTRODUCTION DATA, EXPRESSIONS, STATEMENTS: Introduction: Creativity and motivation, understanding programming, Terminology: Interpreter and compiler, Running Python, The First Program; Data types: Int, float, Boolean, string, and list, variables, expressions, statements, Operators and operands.			
Module-2			
CONTROL FLOW, LOOPS: Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (ifelif-else); Iteration: while, for, break, continue, pass statement.			
Module-3			
FUNCTIONS AND STRINGS: Functions: Function calls, adding new functions, definition and uses, local and global scope, return values. Strings: strings, length of string, string slices, immutability, multiline comments, string functions and methods;			
Module-4			
LISTS, TUPLES, DICTIONARIES: Lists: List operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, list comprehension; Tuples: tuple assignment, tuple as return value, tuple comprehension; Dictionaries: operations and methods, comprehension;			
Module-5			
REGULAR EXPRESSIONS, FILES AND EXCEPTION: Regular expressions: Character matching in regular expressions, extracting data using regular expressions, Escape character Files and exception: Text files, reading and writing files, command line arguments, errors and exceptions, handling exceptions, modules.			

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

1. Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Represent compound data using Python lists, tuples, Strings, dictionaries.
4. Read and write data from/to files in Python Programs

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Examination (CIE)

- For the Assignment component of the CIE, there are 25 marks and for the Internal Assessment Test component, there are 25 marks.
- The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods mentioned in the 220B2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examinations (SEE)

SEE paper shall be set for 50 questions, each of 01 mark. The pattern of the question paper is MCQ (multiple choice questions). The time allotted for SEE is **01 hour**. The student has to secure a minimum of 35% of the maximum marks meant for SEE.

Suggested Learning Resources:**Textbooks:**

1. Charles R. Severance, "Python for Everybody: Exploring Data Using Python 3", 1st Edition, CreateSpace Independent Publishing Platform, 2016.
http://do1.dr.chuck.com/pythonlearn/EN_us/pythonlearn.pdf
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015. (Chapters 15, 16, 17)
<http://greenteapress.com/thinkpython2/thinkpython2.pdf>

Reference books:

1. R. Nageswara Rao, "Core Python Programming", dreamtech
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Python Programming, Reema theraja, OXFORD publication

Web links and Video Lectures (e-Resources):

1. <https://www.w3resource.com/python/python-tutorial.php>
2. <https://data-flair.training/blogs/python-tutorials-home/>
3. <https://www.youtube.com/watch?v=c235EsGFcZs>
4. <https://www.youtube.com/watch?v=v4e6oMRS2QA>
5. <https://www.youtube.com/watch?v=Uh2ebFW8OYM>
6. <https://www.youtube.com/watch?v=oSPMmeaiQ68>
7. https://www.youtube.com/watch?v=_uQrJ0TkZlc
8. <https://www.youtube.com/watch?v=K8L6KVGG-7o>

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Real world problem solving: Demonstration of projects developed using python language


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BSCK307 – Social Connect & Responsibility 2022 Scheme & syllabus for 3rd sem		Semester	3 rd
Course Code	BSCK307	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:3:1	SEE Marks	-----
Total Hours of Pedagogy	40 hour Practical Session +15 hour Planning	Total Marks	100
Examination nature (No SEE – Only CIE)	For CIE Assessment - Activities Report Evaluation by College NSS Officer / HOD / Sports Dept / Any Dept.		
Credits	01 - Credit		

Course objectives: The course will enable the students to:

1. Provide a formal platform for students to communicate and connect to the surrounding.
2. create a responsible connection with the society.
3. Understand the community in general in which they work.
4. Identify the needs and problems of the community and involve them in problem –solving.
5. Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
6. Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

General Instructions - Pedagogy :

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the activities will develop students' theoretical and applied social and cultural skills.
2. State the need for activities and its present relevance in the society and Provide real-life examples.
3. Support and guide the students for self-planned activities.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress in real activities in the field.
5. Encourage the students for group work to improve their creative and analytical skills.

Contents :

The course is mainly activity-based that will offer a set of activities for the student that enables them to connect with fellow human beings, nature, society, and the world at large.

The course will engage students for interactive sessions, open mic, reading group, storytelling sessions, and semester-long activities conducted by faculty mentors.

In the following a set of activities planned for the course have been listed:

Social Connect & Responsibility - Contents**Part I:****Plantation and adoption of a tree:**

Plantation of a tree that will be adopted for four years by a group of BE / B.Tech students. (ONE STUDENT ONE TREE)

They will also make an excerpt either as a documentary or a photo blog describing the plant's origin, its usage in daily life, its appearance in folklore and literature – Objectives, Visit, case study, report, outcomes.

Part II :**Heritage walk and crafts corner:**

Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms – Objectives, Visit, case study, report, outcomes.

Part III :**Organic farming and waste management:**

Usefulness of organic farming, wet waste management in neighboring villages, and implementation in the campus –

Objectives, Visit, case study, report, outcomes.

Part IV:

Water conservation:

Knowing the present practices in the surrounding villages and implementation in the campus, documentary or photoblog presenting the current practices – Objectives, Visit, case study, report, outcomes.

Part V :

Food walk:

City's culinary practices, food lore, and indigenous materials of the region used in cooking – Objectives, Visit, case study, report, outcomes.

Course outcomes (Course Skill Set):

At the end of the course, the student will be able to:

CO1: Communicate and connect to the surrounding.

CO2: Create a responsible connection with the society.

CO3: Involve in the community in general in which they work.

CO4: Notice the needs and problems of the community and involve them in problem –solving.

CO5: Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.

CO6: Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

Activities:

Jamming session, open mic, and poetry: Platform to connect to others. Share the stories with others. Share the experience of Social Connect. Exhibit the talent like playing instruments, singing, one-act play, art-painting, and fine art.

PEDAGOGY:

The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersion with NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector?

COURSE TOPICS:

The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversational will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem.

Duration :

A total of 40 - 50 hrs engagement per semester is required for the 3rd semester of the B.E. /B.Tech. program. The students will be divided into groups. Each group will be handled by faculty mentor. Faculty mentor will design the activities (particularly Jamming sessions open mic ,and poetry) Faculty mentors has to design the evaluation system as per VTU guidelines of scheme & syllabus.

Guideline for Assessment Process:

Continuous Internal Evaluation (CIE):

After completion of the course, the student shall prepare, with daily diary as reference, a comprehensive report in consultation with the mentor/s to indicate what he has observed and learned in the social connect period. The report should be signed by the mentor. The report shall

be evaluated on the basis of the following criteria and/or other relevant criteria pertaining to the activity completed. Marks allotted for the diary are out of 50. Planning and scheduling the social connect Information/Data collected during the social connect Analysis of the information/data and report writing Considering all above points allotting the marks as mentioned below

Excellent	: 80 to 100
Good	: 60 to 79
Satisfactory	: 40 to 59
Unsatisfactory and fail	: <39

Special Note :

NO SEE – Semester End Exam – Completely Practical and activities based evaluation

Pedagogy – Guidelines :

It may differ depending on local resources available for the study as well as environment and climatic differences, location and time of execution.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	Plantation and adoption of a tree:	May be individual or team	Farmers land/ parks / Villages / roadside/ community area / College campus etc.....	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
2.	Heritage walk and crafts corner:	May be individual or team	Temples / monumental places / Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc.....	Site selection /proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
3.	Organic farming and waste management:	May be individual or team	Farmers land / parks / Villages visits / roadside/ community area / College campus etc.....	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
4.	Water conservation: & conservation techniques	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers / campus etc.....	site selection / proper consultation/Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
5.	Food walk: Practices in society	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc.....	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty

Plan of Action (Execution of Activities)

Sl.NO	Practice Session Description
1	Lecture session in field to start activities
2	Students Presentation on Ideas
3	Commencement of activity and its progress
4	Execution of Activity
5	Execution of Activity
6	Execution of Activity
7	Execution of Activity
8	Case study based Assessment, Individual performance
9	Sector/ Team wise study and its consolidation
10	Video based seminar for 10 minutes by each student At the end of semester with Report.

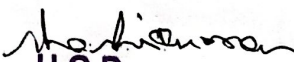
- Each student should do activities according to the scheme and syllabus.
 - At the end of semester student performance has to be evaluated by the faculty for the assigned activity progress and its completion.
 - At last consolidated report of all activities from 1st to 5th, compiled report should be submitted as per the instructions and scheme.
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Assessment Details for CIE (both CIE and SEE)

Weightage	CIE – 100%	
Field Visit, Plan, Discussion	10 Marks	• Implementation strategies of the project (NSS work). • The last report should be signed by NSS Officer, the HOD and principal. • At last report should be evaluated by the NSS officer of the institute. • Finally the consolidated marks sheet should be sent to the university and also to be made available at LIC visit.
Commencement of activities and its progress	20 Marks	
Case study based Assessment Individual performance with report	20 Marks	
Sector wise study & its consolidation 5*5 = 25	25 Marks	
Video based seminar for 10 minutes by each student At the end of semester with Report.	25 Marks	
Activities 1 to 5, 5*5 = 25		
Total marks for the course in each semester	100 Marks	

For each activity, 20 marks CIE will be evaluated for IA marks at the end of semester, Report and assessment copy should be made available in the department.

Students should present the progress of the activities as per the schedule in the prescribed practical session in the field. There should be positive progress in the vertical order for the benefit of society in general through activities.


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