DAYALBAGH EDUCATIONAL INSTITUTE
FACULTY OF ENGINEERING
B.TECH. (AGRICULTURAL ENGINEERING): 2022-23

DETAILED SYLLABUS

THIRD SEMESTER

COURSE NUMBER	COURSE TITLE	Credits	End sem. Exam.	Theory/ Practical
AEM301	PRINCIPLES OF AGRONOMY	2.0	Y	T
AEM302	AGRONOMYLAB	1.0	Y	P
AEM303	SOIL MECHANICS	3.0	Y	T
AEM304	SOIL TECH LAB	1.0	Y	P
EEM301	BASIC ELECTRONICS	3.0	Y	T
EEM302	BASIC ELECTRONICS LAB	1.0	Y	P
EEM303	DATA STRUCTURE	3.0	Y	T
MEM307	MECHANICS OF SOLIDS AND FLUIDS	3.0	Y	T
MEM308	MATERIAL TESTING AND FLUIDS LAB	1.0	Y	P
MAM381	ENGINEERING MATHEMATICS III	3.0	Y	T
ENH381	ENGLISH III	3.0	Y	T
EGC381	PRODUCT MANUFACTURING PROJECT	1.0	Y	P
EGC382	PRACTICAL TRAINING	2.0	Y	P
GKC381	SC. METH., GK,& CURRENT AFFAIRS III	1.0	N	T
Total Credits		28.0		

Course Number**: AEM 301,** Course Title**: PRINCIPLES OF AGRONOMY**
Class: B.Tech., Status of Course: FULL COURSE, Approved since session:
Total Credits:2, Periods(55 mts. Each)/week:2(L-2+T/P/S-0), Min.pds./sem.:26
Unit 1
Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry.
Unit 2
Crop nutrition, manures and fertilizers, nutrient use efficiency.
Unit3
Water resources, soil-plant-water relationship, crop water requirement, water use efficiency, irrigation- scheduling criteria and methods, quality of irrigation water, water logging.
Unit 4
Weeds- importance, classification, crop weed competition, concepts of weed management-principles and methods, herbicides- classification, selectivity and resistance, allelopathy.
Unit 5
Growth and development of crops, factors affecting growth and development, plant ideotypes, cropping systems, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Suggested Readings:
De, Gopal Chandra 1989, Fundamentals of Agronomy. Oxford & IBH Publishing Co., New-Delhi.
ICAR 1989 Handbook of Agriculture, Indian Council of Agricultural Research, New-Delhi
Michael, A.M. and Ojha, T.P. 1986. Principles of Agricultural Engineering, Vol.II Jain Brothers, New Delhi.
Morachan, Y.B. 1986, Crop production and management, Oxford & IBH Publishing Co., New-Delhi.
Porwal, B.L. and Sharma, D.D. 1991. Sashya Vigyan KeAdhunic Siddhant (Hindi) Alka Publishers, Ajmer.
Darashikoh – Nuskha Dar Fanni – Falahat (The Art of Agriculture). Translated from Persian to English by Razia Akbar (2000) with commentaries by K.L. Mehra, K.L. Chadhan, J.S. Kanwar and Y.L. Nene. Asian Agri- History Foundation, Secunderabad, Bull No. 3, pp : 136.
Kashyapa – KashuliyaKrishisukti (A Treatise on Agriculture by Kashyapa). Translated from Sanskrit to English by S.M. Ayachit (2002) with commentaries by Nalini Sadhale and Y.L. Nene, Asian Agri-History Foundation, Secunderabad, Bull No. 4. pp : 168.
NCA (1976), Reports of the National Commission on Agriculture, Govt. of India, New Delhi. Ojha, Madhusudan (1942), Kadambini (Sanskrit), Pub. Pradyumna Sarma Ojha, Jaipur.
Parashara – Krishi Parashara (Agriculture by Parashara). Translated from Sanskrit to English by Nalini Sadhale (1999) with commentaries by H.V. Balkundi and Y.L. Nene. Asian Agri-History Foundation, Secunderabad, Bull No. 2, pp : 104.
Rapala – Vrikshayurveda (The Science of Plant life). Translated from Sanskrit to English by Nalini Sadhale (1996) with commentaries by K.L. Mehra, S.M. Virmani and Y.L. Nene. Asian Agri-History Foundation, Secunderabad, Bull No. 1, pp : 104.
Nene, Y.L. and Choudhary, S.L. 2002. Agricultural Heritage in India. Asian Agri-History Foundation (AAHF), Secunderabad, Rajasthan Chapter of AAHF, Udaipur.
Nene, Y.L. 2007. Glimpses of the Agricultural Heritage of India. Asian Agri- Histroy Foundation, Secunderabad, Andhra Pradesh.
Choudhary, S.L., Sharma, G.S. and Nene, Y.L. 2000. Ancient and Medieval History of Indian Agriculture. Rajasthan College of Agriculture, Udaipur, Rajasthan.
Reddy, S.R. 2016. Principles of Agronomy. Kalyani Publishers, Ludhiana, 5th Edition.
Yellamanda Reddy, T. and SankaraReddi, G.H. 2016. Principles of Agronomy, KalyaniPublishers, Ludhiana.

Course No: AEM302, Course Title: AGRONOMY LAB
Class: B.Tech., Status of Course: Major Course, Approved since session:
Total Credits: 1, Periods (55 mts. each)/week: 2(L:0+T:0+P:2+S:0), Min.pds./sem:26
1. Identification of crops and their varieties;
2. Identification ofseeds;
3. Identification of manures;
4. Identification of fertilizers;
5. Identification of weeds;
6. Fertilizer application methods;
7. Different weed control methods;
8. Practice of ploughing, Practice of Puddling,
9. Practice of sowing
10. Judging maturity time for harvesting of crop;
11. Study of seed viability and germination test;

12. seed extraction techniques; identification of important pests and diseases and their control.
13. Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement,
14. Use of tillage implements-reversible plough, one way plough, harrow, leveler, seed drill,
15. Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

Course Number: AEM 303, Course Title: SOIL MECHANICS
Class: B.Tech., Status of Course: FULL COURSE, Approved since session:
Total Credits:3, Periods(55 mts. Each)/week:3(L-3+T-1+P/S-0), Min.pds./sem.:52
Unit1
Soil genesis and classification - Nature and origin of soil; soil forming rocks and minerals, their classification and composition, soil forming processes, classification of soils – soil taxonomy orders, Important soil physical properties; and their importance; soil particle distribution. Soil colloids– their composition,properties and origin of charge;
Unit2
ion exchange in soil and nutrient availability, Soil organic matter – its composition and decomposition, effect on soil fertility, Soil reaction – acidic, saline and sodic soils; quality or irrigation water; essential plants nutrients – their functions and deficiency symptoms in plants;important inorganic fertilizers and their reactions in soils, Use of saline and sodic water for crop production, Gypsum requirement for reclamation of sodic soils and neutralising RSC; Liquid fertilizers and their solubility and compatibility.
Unit3
Introduction of soil mechanics, field of soil mechanics, phase diagram, physical and index properties of soil, classification of soils, effective and neutral stress, elementary concept of Boussinesq and Wester guards analysis, new mark influence chart.Seepage Analysis; Quick condition-two dimensional flow-Laplace equation, Velocity potential and stream function, Flow net construction.
Unit4
Shear strength, Mohr stress circle, theoretical relationship between principle stress circle, theoretical relationship between principal stress, Mohr coulomb failure theory, effective stress principle. Determination of shear parameters by direct shear test, triangle test & vane shear test.Compaction, composition of soils standard and modified protector test.
Unit5
abbot compaction andJodhpur mini compaction test field compaction method and control.Consolidation of soil: Consolidation of soils, one dimensional consolidation spring analogy,
Terzaghi's theory, Laboratory consolidation test, calculation of void ratio and coefficient of volume change, Taylor's and Casagrande's method, determination of coefficient of consolidation.Earth pressure, Rankine's theory of earth pressure, Stability of slopes, Taylor's stability number.

Suggested Readings
Brady Nyle C and Ray R Well. 2002. Nature and properties of soils. Pearson Education Inc., New Delhi.
Indian Society of Soil Science. 1998. Fundamentals of Soil Science. IARI, New Delhi
Biswas TD. And Mukherjee, S.K. "Text Book of Soil Science"New Delhi, Tata Mgraw,1987.
Ghildyal B.P. and Tripathi, R.P. "Soil Physics", Wiley eastern Ltd, 1987.
Hillel, D. "Introduction to Soil Physics" , San Diego, Academic press, 1982.
Punmia B C, Jain A K and Jain A K. 2005. Soil Mechanics and Foundations. Laxmi Publications (P) Ltd. New Delhi.
Ranjan Gopal and Rao A S R. 1993. Basic and Applied Soil Mechanics. Welley Easters Ltd., New Delhi.
Singh Alam. 1994. Soil Engineering Vol. I. CBS Publishers and Distributions, Delhi.

Course No: AEM304, Course Title: SOIL TECH LAB
Class: B.Tech., Status of Course: Major Course, Approved since session:
Total Credits: 1, Periods (55 mts. each)/week: 2(L:0+T:0+P:2+S:0), Min.pds./sem:26

1. Identification of rocks and minerals; Examination of soil profile in the field;
2. Collection of Soil Sample; Determination of bulk density; particle density and porosity of soil;
3. Determination of organic carbon of soil; Determination of Nitrogen, Determination of Phosphorus and Determination of Potassium;
4. Identification of nutrient deficiency symptoms of crops in the field; Determination of gypsum requirement of sodic soils;
5. Determination of water quality parameters.Determination of water content of soil/determination of specific gravity of soil;
6. Determination of field density of soil by core cutter method; Determination of field density by sand replacement method;
7. Grain size analysis by sieving (Dry sieve analysis); Grain size analysis by hydrometer method;
8. Determination of liquid limit by Casagrande's method; Determination of liquid limit by cone penetrometer and plastic limit; Determination of shrinkage limit;
9. Determination of permeability by constant head method; Determination of permeability by variable head method;
10. Determination of compaction properties by standard proctor test; Determination of shear parameters by Direct shear test;
11. Determination of unconfined compressive strength of soil;
12. Determination of shear parameters by Tri-axial test;
13. Determination of consolidation properties of soils.

Course Number: EEM 301, Course Title: Basic Electronics
Class: B.Tech., Status of Course: FULL COURSE, Approved since session: 2015-16
Total Credits:3, Periods(55 mts. Each)/week:3(L-3+T-1+P/S-0), Min.pds./sem.:39

UNIT 1
Intrinsic & Extrinsic Semiconductors. P-N Junction Diode, Working Principle, Forward and Reverse Characteristics, Breakdown, DC and AC Load Lines, Dynamic Resistance. Specifications, Rectifier Configurations, Filtering, Regulation, Zener Diode, Voltage Regulators.
UNIT 2
Qualitative description of charge transport in BJT, α, β, CE, CD, and CC configurations, Input &output characteristics. Biasing schemes. DC and AC load lines, Maximum Symmetrical Swing, BiasStability Power Calculations.
UNIT 3
Amplifier as a two port. Classification as VCVS, VCCS, CCVS and CCCS. Gain and its logarithmicunits. Concept of feedback in amplifiers.Ideal Op-amp, applications, e.g., inverting, non-inverting, summing and differentiating amplifiers,differentiation integrator, comparator, Schmitt trigger, logarithmic amplifier.
UNIT 4
Number systems and Codes, BCD, ASCII, Excess 3 and Gray codes. Code conversion. Negativenumber representation. Binary addition and subtraction. Boolean algebra & truth tables and basiclogic gates, universal gates, half adder, full adder circuits.
UNIT 5
Flip-flops as memory elements, registers, counters (only working principles no design problem),Memories. Need for Digital to Analog/Analog to Digital conversion, Digital to Analog conversiontechniques, Analog to Digital conversion schemes.

SUGGESTED READING:
Malvino& Leach: DIGITAL COMPUTER ELECTRONICS

V Del Toro: ELECTRICAL ENGINEERING FUNDAMENTALS
Millaman&Grabel: MICROELECTRONICS
HUGHES ELECTRICAL AND ELECTRONIC TECHNOLOGY revised by I McKenzie Smith

Course No: EEM302, Course Title: Basic Electronics Lab
Class: B.Tech., Status of Course: Major Course, Approved since session: 2015-16
Total Credits: 1, Periods (55 mts. each)/week: 2(L:0+T:0+P:2+S:0), Min.pds./sem:26

List of Experiments
1. Network Theorem verification
2. RLC circuit Response
3. p-n junction characteristics
4. BJT characteristics
5. Biasing circuit analysis and design.
6. Frequency response of CE amplifier.
7. Op-amp and inverting/non-inverting amplifier.
8. Astable multivibrator using IC555 timer.
9. Monostable multivibrator using IC555 timer.

Course Number: EEM 303, Course Title: Data Structure
Class: B.Tech., Status of Course: FULL COURSE, Approved since session: 2015-16
Total Credits:3, Periods(55 mts. Each)/week:3(L-3+T-1+P/S-0), Min.pds./sem.:39

UNIT 1
Structures and Files, Algorithms and Introduction to Complexity Analysis, Program
Developmentwith step-wise refinement.
UNIT 2
Arrays, Stacks, Queues and Strings.
UNIT 3
Pointers, Linked Lists, Creation, Insertion and other data processing applications.
UNIT 4
Trees, Graphs.
UNIT 5
Searching and sorting Algorithms and their analysis.

SUGGESTED READINGS:
AS Tannenbaum, Y Langsam, M. Augenstein: DATA STRUCTURES USING C AND C++, 2nd Edition, Prentice Hall.
Mark A Weiss: DATA STRUCTURES AND PROBLEM SOLVING USING C++, 2nd Edition, Addison Wesley.
R Kruse, B. Leung, C Tondo: DATA STRUCTURES AND PROGRAM DESIGN IN C, Prentice Hall.

Course Number: MEM307, Course Title: MECHANICS OF SOLIDS AND FLUIDS
Class: B.Tech., Status of Course: Major Course, Approved since session: 2000-01
Total Credits: 3, Periods (55 mts. each)/week: 3(L:3+T:1+P:0+S:0), Min.pds./sem.: 39
UNIT 1
UNIAXIAL STRESS & STRAIN: Stress in axially loaded members, strain, constitutive laws.
Axial deformation.
STRESS TRANSFORMATION: Two-dimensional stress system. Analytical and Mohr's circle
methods. Principal stresses & planes maximum shear stress.
UNIT 2
TORSION: Torsion of circular bars. Torsion formula. Shear stress. Angle of twist.
BENDING: Flexure formula. Bending stress. Shear stress in beams.
UNIT 3
COLUMN: Elastic buckling. Euler's formula. Various end conditions. Rankine formula. Empirical
formulas.
FLUID MECHANICS: Lagrangian and Eulerian approaches. Lines of flow. Path line. Streamline.
Streak line. Stream tube. Types of flow. Steady and unsteady, uniform and non-uniform,
laminar & turbulent. Continuity equation (one dimensional).

TYPES OF ENERGIES: Potential, Kinetic, and Pressure Energies. Bernoulli's theorem. Its proof and limitations. K.E. correction factor.

UNIT 4

FLOW MEASUREMENT: Principles. Venturimeter, horizontal, vertical & inclined. Orifices,classification, vena contracta. Hydraulic coefficients. Discharge through a large rectangular orifice. Drowned and partially drowned orifices.

MOUTH PIECES: Types. External mouthpiece. Convergent divergent mouthpiece. Notches. Types. Rectangular and triangular notches. Weirs. Types. Rectangular weir. Francis and basins formulae. Velocity of approach.

UNIT 5

FLOW THROUGH PIPES: Reynold's experiment. Types of flow. Critical velocities. Reynold's number. Friction loss. Darcy-Weisbach equation. Friction factor concept. Losses at entry, exit, bend and valves. Hydraulic and energy gradient lines. Power transmission through pipes. Condition for maximum power.

FLOW THROUGH OPEN CHANNELS: Chezy's& Manning's equations. Bazin's and Kutter'sexpressions for Chezy's constants. Best discharging section. Rectangular & Trapezoidal channels.

SUGGESTED READINGS:
Popov: ENGINEERING MECHANICS OF SOLIDS Jain: FLUID MECHANICS
Singer: STRENGTH OF MATERIALS Jagdish Lal: HYDRAULIC AND FLUID MECHANICS
Junarkar: MECHANICS OF STRUCTURES Punmia& Goyal: STRENGTH OF MATERIAL

Course No: MEM308, Course Title: MATERIAL TESTING AND FLUIDS LAB

Class: B.Tech., Status of Course: Major Course, Approved since session: 2000-2001
Total Credits: 1, Periods (55 mts. each)/week: 2(L:0+T:0+P:2+S:0), Min.pds./sem:26

1. Determination of Tensile strength of a mild steel specimen
2. Determination of hardness of a material on hardness tester.
3. Determination of impact strength/ toughness on Izod Test machine.
4. Determination of angle of twist and torque value on torsion test machine.
5. Determination of compressive stress for a brick on UTM
6. Determination of coefficient of discharge using Veturimeter for a pipe flow.
7. Determination of coefficient of discharge using mouth piece and orifice and to find out discharge.
8. Experiment on 60 dgree and 90 degree V notch for a channel flow.
9. Determine the value of coefficient of friction, 'f' for the given G.I. pipe
10. Obtain the value of coefficient of discharge at six different heads for ¾" cylindrical mouthpiece (a) discuss the variation of actual C with head (b) discuss the variation of actual C with H

Course Number: MAM381, Course Title: ENGINEERING MATHEMATICS III

Class: B.Tech., Status of Course: Major Course, Approved since session: 2009-10
Total Credits: 3, Periods (55 mts. each)/week: 3(L:3+T:1+P:0+S:0), Min.pds./sem.: 39

UNIT 1
Standard Forms, Shifting and Convolution Theorems, Transforms of derivatives. Inverse Laplace Transforms, Laplace transforms of error function, Heavyside Direct Delta Functions, Applications of Laplace Transforms.

UNIT 2
Finite and Infinite Fourier Transforms, Fourier Integral Theorem, Inversion Theorem, Applications of Fourier Transforms.

UNIT 3
Analytic Function, Cuachy-Reimann Equation, Conjugate harmonic functions.

UNIT 4
Integration, Cauchy's Theorem, Cauchy's Integral Formulae, Taylor's and Lautent's expansions, Zeros and poles.

UNIT 5
Residues, Cauchy Residues Theorem, Simple problems in contour integration.
SUGGESTED READINGS:
MD Raisinghania: INTEGRAL TRANSFORMS
Schaum's Series: LAPLACE TRANSFORM
Schaum's Series: COMPLEX VARIABLES

Course Number: ENH381, Course Title: ENGLISH III
Class: B.Tech., Status of Course: NF HALF COURSE, Approved since session: 2009-10
Total Credits: 3, Periods (55 mts. each)/week: 3(L:3+T:0+P:0+S:0), Min.pds./sem: 39
UNIT 1: Reading and Listening Comprehension
UNIT 2: Basics and Forms of Technical and Business Communication.
UNIT 3: Precise and Paragraph writing
UNIT 4: Writing of Scientific and Technical Texts
UNIT 5: Essay writing and Expansion

Course Number: EGC381, Course Title: PRODUCT MANUFACTURING PROJECT
Class: B.Tech., Status of Course: CORE COURSE, Approved since session: 2007-08
Total Credits: 1.0, Periods (55 mts. each)/week: 2 (L:0+T:0+P:3+S:0), Min.pds./sem.: 39
For B.Tech. Agricultural Engineering
1. Design and installation of water harvesting structures at a smaller scale
2. Development of sensors for estimation of soil characteristics
3. Development of mobile applications for nutrient management, irrigation management, crop health monitoring etc.
4. Design and install hydroponic/aeroponic system for any vegetable crop
5. Development of farm machinery tools for small scale field operations
6. Proration and characterisation of soil less media from waste materials
7. Development of solar operated system for various farm operations
8. Design and implementation of safety measures for dairy farm
9. Manufacture of nutrient rich food products
The students are encouraged to adopt the following methodologies:
1. Identify the products for the project.
2. To check the technical feasibility and financial viability of the project.
3. To discuss the above during brain solving session.
4. To prepare utility article as furniture jigs & fixtures. Science and Engineering models for demonstration purpose.
For B.Tech. Civil, Elecrical, Mechanical Engineering and Footwear Technology
PRODUCT DESIGN: Product development process tools, Product function, Bench marking andengineering specifications. (Evaluation on the above theory will constitute 20% of the total marks)
The students are encouraged to
1. Identify the products for the project.
2. To check the technical feasibility and financial viability of the project.
3. To discuss the above during brain solving session.
4. To prepare utility article as furniture jigs & fixtures. Science and Engineering models for demonstration purpose.

Course Number: EGC382, Course Title: PRACTICAL TRAINING
Class: B.Tech., Status of Course: CORE COURSE, Approved since session: 2000-01
Total Credits: 2
For B.Tech. Agricultural Engineering
The students are expected to undergo practical training in industries and local and in house farm engineering facilities to acquaint themselves with various shop floor activities, agri-techno, renewable and bio-engineering environment and problem faced in industries and various farm engineering ventures and enterprises. They are required to submit a report on the training and be evaluated through internal and external viva voce.
For B.Tech. Civil, Elecrical, Mechanical Engineering and Footwear Technology

The students are expected to undergo practical training in different industries allotted to them at different places, in order to acquaint themselves with the various shop floor activities, industrial environment, problems faced in industries. They are required to submit a report on the training and the evaluation through internal and external viva voce.

Course No.GKC351/361/381, Course Title**: SC.METH., G.K.,& CURRENT AFFAIRS III**
Class: B.Tech., Status: Core Course, Approved since session: 2014-15
Total Credits: 1, Periods(55 mts. each)/week:1(L-1+ T-0 +P/S-0), Min.pds./sem. :26
UNIT 1: SCIENCE - Some basic definitions of Scientific terms.
UNIT 2: SCIENCE - Human Physiology and anatomy, Hygiene, Drugs, Diseases, Health Organizations.
UNIT 3: SCIENCE - Information Technology - basic terminology, development in India, Biotechnology - basic terminology, important centres in India and World.
UNIT 4: SCIENCE - Inventions and discoveries, Indian Space Programmes, Atomic energy in India, Research centres and Laboratories in India.
UNIT 5: ENVIRONMENTAL STUDIES-POLLUTION AND DISASTER MANAGEMENT
Definition, Causes, Effects and Control Measures of Air, Water, Soil, Marine, Noise and Thermal Pollution, Radiation Pollution, Nuclear Hazards, Solid Waste Management, Role of an Individual in Prevention of Pollution. Floods, Earthquake, Cyclone and Land Slides.

SUGGESTED READING:
NCERT: TEXT BOOKS ON HISTORY, GEOGRAPHY, CIVICS   MANORAMA YEAR BOOK
MR Agarwal: GENERAL KNOWLEDGE DIGEST   NEWS PAPAERS AND MAGAZINES:
HINDI & ENGLISH DAILY NEWS PAPERS   INDIA TODAY
COMPETITION MASTER   SPORTS STAR
COMPETITION SUCCESS REVIEWS   YOJNA