

U.P. Technical University, Lucknow
 Study and Evaluation Scheme of Agricultural Engineering
 Effective from the session 2011-12
 Year IIIrd Semester Vth

S.No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credit
						SESSIONAL EXAM			ESE		
			L	T	P	CT	TA	Total			
THEORY											
1	EHU-501	Engineering and Managerial Economics	3	1	0	30	20	50	100	150	3
2	EAG-501	Design of Agricultural Tractor and Machinery	3	1	0	30	20	50	100	150	4
3	EAG-502	Refrigeration and Air conditioning	2	1	0	15	10	25	50	75	3
4	EAG-503	Watershed Hydrology	2	1	0	15	10	25	50	75	3
5	EAG-504	Machine Design	3	1	0	30	20	50	100	150	4
6	EAG-505	Irrigation & Drainage Engg	3	1	0	30	20	50	100	150	4
PRACTICAL / TRAINING / PROJECT											
7	EAG-551	Refrigeration and Air conditioning Lab	0	0	2	10	10	20	30	50	1
8	EAG-552	Farm Machinery Design Lab	0	0	2	10	10	20	30	50	1
9	EAG-553	Irrigation Engg Lab	0	0	2	10	10	20	30	50	1
10	EAG-554	Drainage Engg Lab	0	0	2	10	10	20	30	50	1
11	GP-501	General Proficiency						50		50	1
		Total	16	6	8					1000	26

U.P. Technical University, Lucknow
 Study and Evaluation Scheme of Agricultural Engineering
 Effective from the session 2011-12
 Year IIIrd Semester VIth

S.No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credit
						SESSIONAL EXAM			ESE		
			L	T	P	CT	TA	Total			
THEORY											
1	EHU-601	Industrial Management	3	0	0	30	20	50	100	150	3
2	EAG-601	Dairy & Food Engg	3	1	0	30	20	50	100	150	4
3	EAG-602	EPBM & Food Quality	2	1	0	15	10	25	50	75	3
4	EAG-603	Ground Water, well & Pump Engg	3	1	0	30	20	50	100	150	4
5	EAG-604	Soil & Water Conservation Engg	2	1	0	15	10	25	50	75	3
6	EAG-605	Tractor System & Control	3	1	0	30	20	50	100	150	4
PRACTICAL / TRAINING / PROJECT											
7	EAG-651	Dairy & Food Engg Lab	0	0	2	10	10	20	30	50	1
8	EAG-652	Ground Water, well & Pump Engg Lab	0	0	2	10	10	20	30	50	1
9	EAG-653	Soil & Water Conservation Engg Lab	0	0	2	10	10	20	30	50	1
10	EAG-654	Tractor System & Control Lab	0	0	2	10	10	20	30	50	1
11	GP-601	General Proficiency						50		50	1
		Total	16	6	8					1000	26

U.P. Technical University, Lucknow
 Study and Evaluation Scheme of Agricultural Engineering
 Effective from the session 2011-12
 Year IVth Semester VIIth

S.No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credit
			L	T	P	SESSIONAL EXAM			ESE		
						CT	TA	Total			
THEORY											
1	EOE-071 to EOE-074	Open Elective-I**	3	1	0	30	20	50	100	150	4
2		Departmental Elective-I	3	1	0	30	20	50	100	150	4
3		Departmental Elective-II	3	1	0	30	20	50	100	150	4
4	EAG-701	Crop Process Engg	3	1	0	30	20	50	100	150	4
5	EAG-702	Soil & Water Conservation Structures	3	1	0	30	20	50	100	150	4
PRACTICAL / TRAINING / PROJECT											
6	EAG-751	Crop Process Engg Lab	0	0	3		20	20	30	50	1
7	EAG-752	Project	0	0	3		50	50		50	2
8	EAG-753	Seminar	0	0	2		50	50		50	1
9	EAG-754	Industrial Training Viva-Voce	0	0	2		50	50		50	1
10	GP-701	General Proficiency						50		50	1
		Total	15	5	10					1000	26

** Open Elective-I

EOE-071 Entrepreneurship Development
 EOE-072 Quality Management
 EOE-073 Operation Research
 EOE-074 Introduction to Biotechnology

U.P. Technical University, Lucknow
 Study and Evaluation Scheme of Agricultural Engineering
 Effective from the session 2011-12
 Year IVth Semester VIIIth

S.No.	Course Code	SUBJECT	PERIODS			Evaluation Scheme				SUBJECT TOTAL	Credit
			L	T	P	SESSIONAL EXAM			ESE		
						CT	TA	Total			
THEORY											
1	EOE-081 to EOE-084	Open Elective-II**	3	1	0	30	20	50	100	150	4
2		Departmental Elective-III	3	1	0	30	20	50	100	150	4
3	EAG-801	Drying & Storage Engg	3	1	0	30	20	50	100	150	4
4	EAG-802	Agricultural Structures & Environmental Control	3	1	0	30	20	50	100	150	3
PRACTICAL / TRAINING / PROJECT											
5	EAG-851	Project	0	0	12		100	100	250	350	8
6	GP-801	General Proficiency						50		50	1
		Total	12	3	12					1000	24

** Open Elective-II

EOE-081 Non-Conventional Energy Resources
 EOE-082 Nonlinear Dynamic System
 EOE-083 Product development
 EOE-084 Automation and Robotics

List of Departmental Electives

Elective I

S.No	Subject Code	Subject Name
1	EAG-011	Rural Water Supply and Sanitation
2	EAG-012	Rural Engg
3	EAG-013	Watershed Planning and Management
4	EAG-014	Waste and Byproducts Utilization
5	EAG-015	Bio-conversion Engg
6	EAG-016	Food processing Plant Design and Layout
7	EAG-017	Ergonomics Principles and Practices
8	EAG-018	Land Development Machinery
9	EAG-019	Mechanics of Tillage and Traction

Elective II

S.No	Subject Code	Subject Name
1	EAG-021	Minor Irrigation and Command Area Development
2	EAG-022	Aquacultural Engg
3	EAG-023	RCC
4	EAG-024	Gully and Ravine Control Structures
5	EAG-025	Development of Processed Products and Equipments
6	EAG-026	Medicinal and Aromatic Plants, Production and Processing
7	EAG-027	Biomass Management for Fodder and Energy
8	EAG-028	Production Technology and Agricultural Machineries
9	EAG-029	Fuel Lubricants and Maintenance

Elective III

S.No	Subject Code	Subject Name
1	EAG-031	Reservoirs and Farm Pond Design
2	EAG-032	Remote Sensing and GIS Application
3	EAG-033	Minor Irrigation System Design
4	EAG-034	Seed Processing
5	EAG-035	Food Packaging Technologies
6	EAG-036	Design and maintenance of Greenhouse
7	EAG-037	Testing of Agricultural Machineries and Tractors
8	EAG-038	Tractor Design Principles

Vth Sem

Design of Agricultural Tractor and Machinery (EAG-501) 4(3+1)

Unit-I

Materials of construction of agricultural tractor and farm machinery - their composition and properties.

Unit-II

Design of basic engine components – cylinder, piston, connecting rod, crankshaft.

Unit-III

Design of air fuel supply system- F.I pump, injectors; Design of cooling system- radiator, fan, pump and thermostat valve; Design of hydraulic system of tractors- hydraulic pump performance, design of hydraulic cylinders, hydraulic control in tractor.

Unit-IV

Force analysis of primary tillage tools and their hitching systems, design of tillage implements- M B plough, disk plough, disk harrow, rotavator.

Unit-V

Design considerations of reapers, mowers, harvesters and threshing machines.

Books:

1. Design of Agricultural tractor by D.N. Sharma and S. Mukesh, Publisher Jain Brother
2. Farm Machinery Design by D.N. Sharma and S. Mukesh, Publisher Jain Brother
3. Numerical Problem in Agricultural Engineering by Shesh Nath Rawat, Publisher Jain Brother

REFRIGERATION AND AIR CONDITIONING (EAG-502) 3(2+1)

Unit-I

Principles of refrigeration, second law of thermodynamics applied to refrigeration, carnot cycle, reversed carnot cycle, coefficient of performance, unit of refrigeration. Refrigeration in food industry, types of refrigeration system.

Unit-II

Refrigerant, desirable properties of ideal refrigerant, cold storages, insulation material, design of cold storages, defrosting.

Unit-III

Mechanical vapour compression, vapour absorption system, components of mechanical refrigeration, Centrifugal and steam jet refrigeration systems, thermoelectric refrigeration systems, vortex tube and other refrigeration systems, ultra low temperature refrigeration.

Unit-IV

Thermodynamic properties of moist air, perfect gas relationship for approximate calculation, adiabatic saturation process, wet bulb temperature and its measurement, psychrometric chart and its use, air conditioning principles, type and functions of air conditioning system, air distribution and duct design methods, Psychrometric processes, types of air conditioners & applications.

Books:

1. Refrigeration and Air conditioning by C.P. Arora
2. Thermal Environmental Engineering by J.L. Threlkald
3. Refrigeration and Air Conditioning by W.F.Stoecker

WATERSHED HYDROLOGY (EAG-503)**3(2+1)****Unit I**

Introduction; hydrologic cycle; precipitation - forms, rainfall measurement, mass curve, hydrograph, mean rainfall depth, frequency analysis of point rainfall, plotting position, estimation of missing data, test for consistency of rainfall records; interception infiltration; evaporation; evapo-transpiration-estimation and measurement; geomorphology of watersheds - stream number, stream length, stream area, stream slope and Horton's laws.

Unit II

Runoff - factors affecting, measurement; stage and velocity, rating curve, extension of rating curve; estimation of peak runoff rate and volume; rational method, Cook's method, SCS method, Curve number method.

Unit III

Hydrograph; components, base flow separation, unit hydrograph theory - unit hydrograph of different durations, dimensionless unit hydrograph, distribution hydrograph, synthetic unit hydrograph, uses and limitations of unit hydrograph.

Unit IV

Head water flood control - methods, retards and their location; flood routing – graphical methods of reservoir flood routing; hydrology of dry land areas - drought and its classification; introduction to watershed management and planning.

Books:

1. Engineering Hydrology by Subramanya, K.
2. Hydrology by M.M. Raghunath.
3. Applied Hydrology by K.N. Mutreja.
4. Hydrology and Soil Conservation Engineering by Ghanshyam Das

MACHINE DESIGN (EAG-504)**4 (3+1)****Unit-I**

Meaning of design, Phases of design, design considerations. Common engineering materials and their mechanical properties.

Unit-II

Types of loads and stresses, theories of failure, factor of safety, selection of allowable stress. Stress concentration. Elementary fatigue and creep aspects.

Unit-III

Cotter joints, knuckle joint and pinned joints, Design of welded subjected to static loads, Design of threaded fasteners subjected to direct static loads, bolted joints and bolted joints subjected to eccentric loading.

Unit-IV

Design of shafts under torsion and combined bending and torsion, Design of keys, Design of muff, sleeve, and rigid flange couplings.

Unit-V

Design of helical and leaf springs, Design of flat belt and V-belt drives and pulleys, Design of gears, Design of screw motion mechanisms like screw jack, lead screw etc., Anifricion bearings.

Books:

1. Machine Design by Dr. Sadhu Singh
2. Machine Design by Sharma & Agarwal
3. Machine Design by J.E. Shigley
4. Design of Machine. Elements by M.F. Spotts
5. Elements of Machine. Design by Pandya & Shah

IRRIGATION AND DRAINAGE ENGINEERING (EAG-505)

4 (3+1)

Unit I

Purpose of irrigation, sources of irrigation water, present status of development and utilization of different water resources of the country; common irrigation terminology water distribution pattern and system of levying irrigation charges.

Unit II

Measurement of irrigation water, weir, notches, flumes and orifices and other methods; water conveyance, design of irrigation field channels, Lacey's and Kennedy's theory, underground pipe conveyance system, irrigation structures, channel lining; land grading, different design methods and estimation of earth work and cost.

Unit III

Soil water plant relationship, soil water movement, infiltration, evapo-transpiration, soil moisture constants, depth of irrigation, frequency of irrigation, irrigation efficiencies.

Unit IV

Surface irrigation methods of water application, border, check basin, furrow and contour irrigation; sprinkler and drip irrigation method, merits, demerits, selection and design. Surface drainage, drainage coefficient, types of surface drainage, design of open channel.

Unit V

Sub-surface drainage purpose and benefits, investigations of design parameters, hydraulic conductivity, drainable porosity, water table etc., types of use of subsurface drainage system, steady and unsteady state methods for drain depth and spacing, installation and cost estimation, drainage of salt affected soils and leaching requirement inter-relation of irrigation and drainage, canal command area, development programmes.

Refrigeration and Air Conditioning Lab (EAG-551)

2(0+2)

1. Study of vapour compression and vapour absorption systems
2. Solving problems on refrigeration on vapour absorption system

3. Experiments with the refrigeration tutor to study various components of refrigeration
4. Determination of the coefficient of performance of the refrigeration tutor
5. Experiment on humidifier for the determination of humidifying efficiency
6. Experiment on dehumidifier for the determination of dehumidifying efficiency
7. Experiment on the cooling efficiency of a domestic refrigerator
8. Experiments on working details of a cold storage plant and air conditioning unit
9. Experiments with air conditioning tutor to study various components
10. Determination of the coefficient of performance of air conditioning tutor
11. Estimation of refrigeration load; Estimation of cooling load for air conditioner
12. Design of complete cold storage system.

Farm Machinery Design Lab (EAG-552) 2(0+2)

1. Study of different types of sliding, bearing and their application.
2. Study of various types of ball and roller bearings with reference to agricultural implements.
3. Study of flat belt and V-belt drives, their types and nomenclature.
4. Design of flat belt drives including pulleys.
5. Design of V-belt drive with specific requirements at farm machinery.
6. Design of bush and roller chain drives for power transmission in farm machines
7. Design and graphical representation of mould board plough bottom for animal and tractor power sources
8. Design of disc for standard disc plough, harrows and vertical disc plough and force analysis.
9. Design of cultivator tynes, shank and ground working tools (shovels and sweeps).
10. Studies on the design aspects of seeding and planting machines.
11. Studies on the design principles of fertilizer broadcasters.

Irrigation Engineering Lab (EAG-553) 2(0+2)

1. Measurement of soil moisture by different soil moisture measuring instruments
2. Measurement of irrigation water
3. Measurement of infiltration rate; computation of evaporation and transpiration

4. Land grading exercises
5. Design of under ground pipe line system
6. Infiltration-advance in border irrigation
7. Measurement of advance and recession in border irrigation and estimation of irrigation efficiency;
8. Measurement of advance and recession in furrow irrigation and estimation of irrigation efficiency
- 10 Measurement of uniformity coefficient of sprinkler irrigation method;
11. Measurement of uniformity coefficient of drip irrigation method;

Drainage Engineering Lab (EAG-554) **2 (0+2)**

1. In-situ measurement of hydraulic conductivity;
2. Determination of drainage coefficients;
3. Installation of piezometer and observation well;
4. Preparation of iso-bath and isobar maps;
5. Measurement of hydraulic conductivity and drainable porosity;
6. Design of surface drainage systems;
7. Design of subsurface drainage systems;
8. Determination of chemical properties of soil and water;
9. Fabrication of drainage tiles; testing of drainage tiles;
10. Determination of gypsum requirement for land reclamation;
11. Installation of sub-surface drainage system;
12. Cost analysis of surface and sub-surface drainage system.

VIth Sem

DAIRY AND FOOD ENGINEERING (EAG-601)

4 (3+1)

Unit I

Dairy development in India. Engineering, thermal and chemical properties of milk and milk products.

Unit II

unit operation of various dairy and food processing systems, process flow charts for product manufacture

Unit III

working principles of equipment for receiving, pasteurization, sterilization, homogenisation, filling & packaging, butter manufacture, dairy plant design and layout.

Unit IV

composition and proximate analysis of food products. Deterioration in products and their controls.

Unit V

Physical, chemical and biological methods of food preservation, changes undergone by the food components during processing, evaporation, drying, freezing juice extraction, filtration, membrane separation, thermal processing, plant utilities requirement.

Books:

1. Brennan, J.G., Butters, J.r. Cowell, N.D. and Lilly, A.E.V. 1976. Food Engineering Operations Applied Science Publishers
2. Farrall, A.W. 1967. Engineering for Dairy and Food Products Wiley Eastern Pvt. Ltd. New Delhi.
3. Kessler, H.G. 1981. Food Engineering and Dairy Technology Verlag A. Kessler, Freising, F.R. Germany
4. Earle, R.L. Unit Operations in Food Processing. Pergamon Press, Oxford
5. McCabe, W.L., Smith, J.C. and Harriott, P. 1993. Unit Operations of Chemical Engineering McGraw Hill, Inc. New York.

ENGINEERING PROPERTIES OF BIOLOGICAL MATERIALS & FOOD QUALITY (EAG-602)

3 (2+1)

Unit I

Importance of engineering properties of biological materials, Study of different physical and thermal characteristics of important biological materials like shape, size, volume, density, roundness, sphericity, surface area, specific heat, thermal conductivity, thermal diffusivity, etc. measurement of colour, flavour, consistency, viscosity, texture and their relationship with food quality and composition.

Unit II Rheological characteristics like stress, strain time effects, rheological models and their equations. Aerodynamic characteristics and frictional properties. Application of engineering properties in handling processing machines and storage structures.

Unit III

Concept, objectives and need of quality, quality control, methods of quality control, sampling; purpose, sampling techniques, requirements and sampling procedures for liquid, powdered and granular materials, sensory quality control, panel selection methods, interpretation of sensory results in statistical quality control, TQM and TQC, consumer preferences and acceptance,

Unit IV

Food Laws and Regulations in India. Food grades and standards BIS, AGMARK, PFA, FPO, CAC (Codex Alimentarius Commission), sanitation in food industry , GMP, HACCP (Hazard analysis and critical control point) and ISO 9000 Series.

Books

1. Physical properties of plant and animal materials by N.N. Mohenensin
2. Engineering properties of foods by Rao, M.A and Rizvi.,S.S.H

GROUNDWATER, WELLS AND PUMPS ENGG (EAG-603)

4 (3+1)

Unit I

Occurrence and movement of ground water, aquifer and its types, classification of wells, familiarization of various types of bore wells common in the state, design of open well, groundwater exploration techniques, methods of drilling of wells.

Unit II

Design of assembly and gravel pack, installation of well screen, completion and development of well, groundwater hydraulics-determination of aquifer parameters by different method such as Theis, Jacob and Chow's etc.

Unit III

Theis recovery method, well interference, multiple well systems, surface and subsurface exploitation and estimation of ground water potential, quality of ground water, artificial groundwater recharge planning, modeling, ground water project formulation.

Unit IV

Pumping Systems: Water lifting devices; different types of pumping machinery, classification of pumps, component parts of centrifugal pumps; pump selection, installation and trouble shooting; design of centrifugal pumps,

Unit V

Performance curves, effect of speed on head capacity, power capacity and efficiency curves, effect of change of impeller dimensions on performance characteristics; hydraulic ram, propeller pumps, mixed flow pumps and their performance characteristics; priming, self priming devices, rotodynamic pumps for special purposes such as deep well turbine pump and submersible pump.

Books:

1. RaghuNath H.M. Ground Water. Willey Eastern Limited, New Delhi.
 2. Todd, D.K. Ground Water Hydrology. John Willey and Sons., New York.
- Michael, A.M. Irrigation Theory and Practice. Vikas Publishing House, New Delhi

**SOIL AND WATER CONSERVATION ENGINEERING (EAG-604)
3(2+1)****Unit I**

Introduction; soil erosion - causes, types and agents of soil erosion; water erosion - forms of water erosion, mechanics of erosion; gullies and their classification, stages of gully development; characteristics of contours and preparation of contour maps; land use capability classification.

Unit II

Erosion control measures – agronomical measures - contour cropping, strip cropping, mulching; mechanical measures - terraces – level and graded broad base terraces and their design, bench terraces & their design, layout procedure, terrace planning, bunds - contour bunds, graded bunds and their design; gully and ravine reclamation - principles of gully control - vegetative and temporary structures.

Unit III

Wind erosion - factors affecting wind erosion, mechanics of wind erosion, soil loss estimation, wind erosion control measures - vegetative, mechanical measures, wind breaks & shelter belts, sand dunes stabilization; soil loss estimation - universal soil loss equation and modified soil loss equation, determination of their various parameters.

Unit IV

Sedimentation - sedimentation in reservoirs and streams, estimation and measurement, sediment delivery ratio, trap efficiency; grassed water ways and their design; introduction to water harvesting techniques; introduction to stream water quality and pollution.

Books:

1. Principles of Agricultural Engineering Vol. II By Michael and Ojha
2. Soil & Water Conservation Engineering by R. Suresh
3. Hydrology and Soil Conservation Engineering by Gahanshyam Das
4. Land and Water Management Engineering V.V.N. Murthy

Tractor Systems and Controls (EAG-605)**4 (3+1)****Unit I**

Performance characteristics of tractor engines. Tractor transmission and final drive: Clutches, types, design consideration and horse power transmission capacity, Tractor power train; selection gear hydrostatic transmission, differential and final drives.

Unit II

Tractor steering mechanisms: Their types, control on crawler and wheel tractors, mechanical steering, caster, camber, to-in & toe-out on tractors, kingpin inclination, tie-rod locking. Auxiliary power transmission power outlets:

Unit III

Tractor hydraulic circuit symbols, response adjustments, loading capacity, category, classification and standardization, position and draft controls Traction Theory: Definition of related terms, rolling resistance, travel reduction, coefficient of traction, tractive efficiency, tractive effort, rim pull, drawbar pull etc., Traction parameters, traction aids

Unit IV

Tractor hitching: Terminology, types, single and two axes hitches, automatic hitching. Mechanics of tractor chassis: Location of c.g., forces acting on tractor and dynamic equilibrium, analysis of force equilibrium with and without implement, frame types and design

Unit V

. Ergonomic applications in man-machine and animal system: Human factors in tractor design with reference to comfort, convenience and safety, effects of noise, vibration and thermal stresses on human performance, Economics of tractor utilization.

Books:

1. Jones, F.R. Farm Gas Engines and Tractors
2. Barger, E.L.; Lijedehl, J.B; Carleton, W.B. and Mc Kibben, E.G. Tractors and their Power Units.
3. Moses and Frost. Farm Power.
4. Radhey Lal and Dutta. Agricultural Engineering through solved examples.
5. Frazeee, Irving and Philip, V.E. Tractors and Crawlers.

DAIRY AND FOOD ENGINEERING Lab (EAG-651) 2 (0+2)

- 1 Determination of the composition of milk and its properties (fat content, total solids, specific gravity, acidity, pH, viscosity etc.)
- 2 . Study of milk plant
4. Study of plate heat exchanger and tubular hear exchanger
5. HTST pasteurization of milk
6. Centrifugal separation of milk
7. Study of vacuum pan and rising film evaporators
8. Visit to milk food factory.
9. Spray drying of milk
10. Study of drum dryer

11. Study of soya milk process and related equipments
12. Design of food processing plant and preparation of layout

GROUNDWATER, WELLS AND PUMPS ENGG LAB (EAG-652) 2 (0+2)

1. Study of different drilling equipments
2. Sieve analysis for gravel and well screens design
3. Visits to drilling sites
4. Study centrifugal pumps, multistage centrifugal pumps, turbine, propeller and other pumps.
5. Testing of centrifugal pump
6. Study of performance characteristics of hydraulic ram, submersible pump.
7. Estimation of aquifer parameters by Thies method.
8. Estimation of aquifer parameters by Coopers Jacob and Chow methods.
9. Estimating of aquifer parameters by Theis Recovery and well losses and well efficiency .
10. Well design under confined and unconfined conditions, Estimation of ground water balance.

**SOIL AND WATER CONSERVATION ENGINEERING LAB
(EAG-653) 2(0+2)**

- 1 Study of soil loss measurement techniques
- 2 Study of details of Coshocton wheel and multi-slot runoff samplers
- 3 Preparation of contour map of an area and its analysis
- 4 Design of vegetative waterways
- 5 Design of contour bunding system
- 6 Design of graded bunding system
- 7 Design of various types of bench terracing systems
- 8 Determination of rate of sedimentation and storage loss in reservoir
- 9 Design of shelter belts and wind breaks.
- 10 Determination of rate of sedimentation and storage loss in reservoir

Tractor Systems and Controls Lab (EAG-654)

2(0+2)

1. Introduction to transmission systems and components
2. Study of clutch functioning, parts and design problem on clutch system
3. Study of different types of gear box,
4. Calculation of speed ratios, design problems on gear box;
5. Study on differential and final drive and planetary gears;
6. Study of brake systems and some design problems;
7. Steering geometry and adjustments;
8. Study of hydraulic systems in a tractor,
9. Hydraulic trailer and some design problems;
10. Traction performance of a tractor wheel;
11. Finding C.G. of a tractor by weighing technique;
12. Finding CG of a tractor using suspension/balancing techniques;
13. Finding moment of Inertia of a tractor;
14. Appraisal of various controls in different makes tractors in relation to anthropometric measurements.

G.B. TECHNICAL UNIVERSITY, LUCKNOW



Syllabus

3rd year (V & VI Sem.)

[Effective from session : 2010-11]

B.Tech. Agricultural Engineering