

Schem & Syllabus of
UNDERGRADUATE DEGREE COURSE

B.Tech. VII & VIII Semester

Agriculture Engineering



Rajasthan Technical University, Kota
Effective from session: 2020-21



RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Scheme & Syllabus

IV Year- VII & VIII Semester: B. Tech. (Agriculture Engineering)

Teaching & Examination Scheme

B.Tech. : Agriculture Engineering

4th Year – VII Semester

THEORY											
SN	Category	Course		Contact hrs/week			Marks				Cr
		Code	Title	L	T	P	Exm Hrs	IA	ETE	Total	
1	PCC	7AG 4-01	Principles of Food Preservation	3	0	0	3	30	120	150	3
2	OE		Open Elective-I	3	0	0	3	30	120	150	3
		Sub Total		6	0	0	-	60	240	300	6
PRACTICAL & SESSIONAL											
3	PCC	7AG 4-21	Principles of Food Preservation-LAB	0	0	3	3	45	30	75	1.5
4		7AG 4-22	Remote Sensing and GIS-LAB	0	0	3	3	45	30	75	1.5
5		7AG 4-23	Waste and By-product Utilization-LAB	0	0	2	3	30	20	50	1.0
6	PSIT	7AG 7-30	Industrial Training	1	0	0		75	50	125	2.5
7		7AG 7-40	Seminar	2	0	0		60	40	100	2
8	SODE CA	7AG 8-00	Social Outreach, Discipline & Extra Curricular Activities	0	0	0		0	25	25	0.5
		Sub- Total		3	0	8		255	195	450	9
		TOTAL OF VII SEMEESTER		9	0	8		315	435	750	15

L: Lecture, **T:** Tutorial, **P:** Practical, **Cr:** Credits

ETE: End Term Exam, **IA:** Internal Assessment



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IV Year- VII & VIII Semester: B. Tech. (Agriculture Engineering)

Teaching & Examination Scheme B.Tech. : Agriculture Engineering 4th Year – VIII Semester

THEORY											
SN	Categor ory	Course		Contact hrs/week			Marks				Cr
		Code	Title	L	T	P	Exm Hrs	IA	ETE	Total	
1	PCC	8AG 4-01	Minor Irrigation and Command Area Development	3	0	0	3	30	120	150	3
2	OE		Open Elective-II	3	0	0	3	30	120	150	3
		Sub Total		6	0	0		60	240	300	6
PRACTICAL & SESSIONAL											
3	PCC	8AG 4-21	Minor Irrigation and Command Area Development- LAB	0	0	2		30	20	50	1
4		8AG 4-22	Micro Irrigation System Design -LAB	0	0	2		30	20	50	1
5	PSIT	8AG 7-50	Project	3	0	0		210	140	350	7
6	SODE CA	8AG 8-00	Social Outreach, Discipline & Extra Curricular Activities	0	0	0		0	25	25	0.5
		Sub- Total		3	0	4		270	205	475	9.5
		TOTAL OF VIII SEMEESTER		9	0	4		330	445	775	15.5

L: Lecture, **T:** Tutorial, **P:** Practical, **Cr:** Credits

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List of Open Electives for Agriculture Engineering			
Subject Code	Title	Subject Code	Title
Open Elective - I		Open Elective - II	
7AN6-60.1	Aircraft Avionic System	8AN6-60.1	Finite Element Methods
7AN6-60.2	Non-Destructive Testing	8AN6-60.2	Factor of Human Interactions
7CH6-60.1	Optimization Techniques	8CH6-60.1	Refinery Engineering Design
7CH6-60.2	Sustainable Engineering	8CH6-60.2	Fertilizer Technology
7CR6-60.1	Introduction to Ceramic Science & Technology	8CR6-60.1	Electrical and Electronic Ceramics
7CR6-60.2	Plant, Equipment and Furnace Design	8CR6-60.2	Biomaterials
7CE6-60.1	Environmental Impact Analysis	8CE6-60.1	Composite Materials
7CE6-60.2	Disaster Management	8CE6-60.2	Fire and Safety Engineering
7CS6-60.1	Quality Management/ISO 9000	8CS6-60.1	Big Data Analytics
7CS6-60.2	Cyber Security	8CS6-60.2	IPR, Copyright and Cyber Law of India
7EE6-60.1	Electrical Machines and Drives	8EE6-60.1	Energy Audit and Demand side Management
7EE6-60.2	Power Generation Sources.	8EE6-60.2	Soft Computing
7EC6-60.1	Principle of Electronic communication	8EC6-60.1	Industrial and Biomedical applications of RF Energy
7EC6-60.2	Micro and Smart System Technology	8EC6-60.2	Robotics and control
7ME6-60.1	Finite Element Analysis	8ME6-60.1	Operations Research
7ME6-60.2	Quality Management	8ME6-60.2	Simulation Modeling and Analysis
7MI6-60.1	Rock Engineering	8MI6-60.1	Experimental Stress Analysis
7MI6-60.2	Mineral Processing	8MI6-60.2	Maintenance Management
7PE6-60.1	Pipeline Engineering	8PE6-60.1	Unconventional Hydrocarbon Resources
7PE6-60.2	Water Pollution control Engineering	8PE6-60.2	Energy Management & Policy
7TT6-60.1	Technical Textiles	8TT6-60.1	Material and Human Resource Management
7TT6-60.2	Garment Manufacturing Technology	8TT6-60.2	Disaster Management



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IV Year- VII & VIII Semester: B. Tech. (Agriculture Engineering)

7AG4-01: Principles of Food Preservation

Credit: 3*

Max. Marks: 150(IA:30, ETE:120)

3L+0T+0P*

End Term Exam: 3 Hours

SN	Contents	Hours
1	Introduction: Objective, scope and outcome of the course. (This compulsory for all course)	1
2	Introduction to foods, types of foods, sources of foods, scope and benefits of industrial food preservation, perishable and non-perishable foods, causes of food spoilage. Food preservation methods: salt and sugar, principle and method, preservation by chemicals, antioxidants, mould inhibitors, acidulants; Fermentation preservation-definitions, advantages and disadvantages, types of fermentations, equipments, applications of food preservation.	8
3	Introduction to thermal processing, types of thermal processing, applications of thermal processing, various thermal processing methods and their applications – canning process for foods, D Value and Z value for microorganisms and nutrients, TDT curve, evaluation of process effectiveness by graphical method; Blanching-theory, equipments, effect on food quality such as nutrients, colour, flavour and texture; Pasteurization – theory, equipments , effect on foods quality; Sterilization- in container sterilization, theory, retorting, UHT process, aseptic process, effect of food quality; Evaporation of foods- theory and principles, boiling point elevation, equipments, effect on foods.	10
4	Introduction to low temperature preservation of foods, applications of low temperature preservation methods, types of low temperature preservation methods: chilling of foods- theory, equipments, chill storage; Freezing-ice crystal formation, solute concentration, freezing time, equipments, effect on food quality; Freeze concentration- principles and process, problems due to precipitation of solids, food applications, equipments; membrane concentration-techniques, equipments used, effect on foods, hurdle technology.	10



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IV Year- VII & VIII Semester: B. Tech. (Agriculture Engineering)

5	Introduction to drying of food materials, drying and dehydration process, advantages of drying of food materials, salient features of drying process, drying of foods- mechanism of drying, process, types of dryers, physical and chemical effect on foods; Irradiation of foods- theory, measurement of doses, dose distribution, effect on microorganisms, effect on foods, applications physical, chemical and biological methods of detections of irradiated foods.; introduction to pulsed electrical field processing, dielectric and ohmic-heating of foods, high process processing.	10
	Total	39



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IV Year- VII & VIII Semester: B. Tech. (Agriculture Engineering)

7AG4- 21: Principles of Food Preservation Lab

Credit: 1.5*

OL+OT+3P*

Max. Marks: 75(IA:45, ETE:30)

End Term Exam: 3 Hours

1. Demonstration of various machineries used in processing.
2. Demonstration of blanching of foods.
3. Preservation of food by high concentration of sugar i.e. preparation of jam.
4. Preservation of food by using salt- Pickle.
5. Preservation of food by using acidulants i.e. pickling by acid, vinegar or acetic acid.
6. Preservation of Bread, Cake using mold inhibitors.
7. Preservation of coconut shreds using humectants.
8. Drying of pineapple slices, apple slices in cabinet drier.
9. Demonstration on drying of green leafy vegetables.
10. Drying of Mango/other pulp by foam mat drying.
11. Demonstration of spray drying of a liquid food.
12. Drying of foods using freeze-drying process.
13. Demonstration of preserving foods by freezing process.



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IV Year- VII & VIII Semester: B. Tech. (Agriculture Engineering)

7AG4- 22: Remote Sensing and GIS Lab

Credit: 1.5*

OL+OT+3P*

Max. Marks: 75(IA:45, ETE:30)

End Term Exam: 3 Hours

1. Study of aerial photographs under mirror stereoscope and preparation of stereo model of aerial photograph,
2. Land use/cover studies through aerial photograph,
3. Use of optical scanners and digitizers,
4. Use of GPS in mapping and GIS data input,
5. Satellite data product,
6. Familiarization with image processing and
7. GIS software's and their applications



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IV Year- VII & VIII Semester: B. Tech. (Agriculture Engineering)

7AG4- 23: Waste and By-product Utilization Lab

Credit: 1*
0L+0T+2P*

Max. Marks: 50(IA:30, ETE:20)
End Term Exam: 3 Hours

1. Waste characterization: (a) temperature (b) pH (c) solids content (d) turbidity (e) BOD (f) COD; Determination of ash content of agril. Wastes.
2. Determination of unburnt carbon in ash of paddy straw.
3. To study about briquetting of agricultural residues.
4. Estimation of excess air for better combustion of briquettes.
5. To study about extraction of oil from rice bran.
6. To study about waste treatment plant in food industry.
7. To study about utilization of whey.
8. To study about recovery of peel oil.
9. To study about recovery of germ and germ oil from by-product of cereals.
10. Practical on bioconversion of agro-wastes.
11. Practical on recycling of agro-wastes and by-products.
12. Visits to various industries using waste and food by-products.



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8AG4-01: Minor Irrigation and Command Area Development

Credit: 3
3L+0T+0P

Max. Marks: 150(IA:30, ETE:120)
End Term Exam: 3 Hours

SN	Contents	Hours
1	Introduction: Objective, scope and outcome of the course. (This compulsory for all course)	1
2	Introduction and description of irrigation projects, various types of irrigation projects and their classification such as major, medium and minor irrigation projects, basics of evaluation process of comparative performance of irrigation projects ; development and utilization of water resources through different minor irrigation schemes commonly adopted.	9
3	Introduction to command area, definition of command area, basic concepts of command area, need of command area, scope of command area, and development approaches in command area, historical perspective of command area, command area development authorities presently working.	10
4	Introduction to planning of farm development activities in relation of command area development, advantages of farm development activities, applications and process of farm development activities, interaction/collaboration of irrigation water use efficiency and agricultural production. Planning and execution of on farm development activities within the scope of command area development.	10
5	Remote sensing- definition, electromagnetic radiations, Interactions with the Atmosphere, Passive v/s Active Sensing, Characteristics of Images, Satellite and Sensors-Satellite Characteristics, Resolution, Multi-spectral Scanning. Use of remote sensing techniques for command area development; case studies of some selected commands; Farmers participation in command area development.	10
	Total	40



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8AG4-21: Minor Irrigation and Command Area Development Lab

Credit: 1
OL+OT+2P

Max. Marks: 50(IA:30, ETE:20)
End Term Exam: 2 Hours

1. Topographic survey and preparation of contour map.
2. Preparation of command area development layout plan.
3. Land leveling design for a field.
4. Earthwork and cost estimation.
5. Irrigation water requirement of crops.
6. Preparation of irrigation schedules.
7. Planning and layout of water conveyance system.
8. Design of Irrigation systems.
9. Conjunctive water use planning.
10. Application of remote sensing for command area development.
11. Technical Feasibility and economic viability of a command area project.
12. Study tour to minor irrigation and command area development projects.



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8AG4-22: Micro Irrigation System Design Lab

Credit: 1
OL+OT+2P

Max. Marks: 50(IA:30, ETE:20)
End Term Exam: 2 Hours

1. Study of different types of micro-irrigation systems and components.
2. Field visit of micro-irrigation system.
3. Study of water filtration unit.
4. Discharge measurement study of different micro-irrigation systems.
5. Study of water distribution and uniformity coefficient.
6. Study of wetted front and moisture distribution under various sources of micro-irrigation system.
7. Design of micro-irrigation system for an orchard.
8. Design of micro-irrigation system for row crops design of spray type micro-irrigation system.
9. Design of micro-irrigation system for hilly terraced land.
10. Study of automation in micro-irrigation system.
11. Study of micro climate inside a Polyhouse.
12. Study of maintenance and cleaning of different components of various systems.
13. Design of sprinkler irrigation system.
14. Design of landscape irrigation system