



Department of Chemical Engineering		LP: CH18028 Rev. No: 00 Date: 04.01.2024
B.E/B.Tech/M.E/M.Tech : Chemical Engineering	Regulation: 2018A	
PG Specialisation : NA		
Sub. Code / Sub. Name : CH18028 FERTILIZER TECHNOLOGY		
Unit : 1		

Unit Syllabus: NITROGENOUS FERTILIZERS

Fertilizer Industry in India, Methods of production of nitrogenous fertilizers – Ammonium Sulphate, nitrate, urea and calcium ammonium nitrate, ammonium chloride and their characteristics and specifications, storage and handling.

Objective: Acquire knowledge in the various fertilizer manufacturing methods

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction of fertilizers, Fertilizer Industries in India	T1, Ch 2; Pg: 7-17	PPT
2	Classification of soil nutrients	T1, Ch 1; Pg: 1- 6	PPT
3	Introduction to Nitrogenous fertilizers	T1, Ch 3; Pg: 18-25	PPT
4	Methods of production of Ammonium Sulphate, specifications, storage and handling.	T1, Ch 3; Pg: 87-92	PPT
5	Methods of production of Ammonium Nitrate, specifications, storage and handling.	T1, Ch 3; Pg: 93-94	PPT
6	Methods of production of Urea, specifications, storage and handling.	T1, Ch 3; Pg: 104-122	PPT
7	Methods of production of Calcium Ammonium Nitrate, specifications, storage and handling.	T1, Ch 3; Pg: 95-97 R2, Ch 8;Pg: 236-8	PPT
8	Methods of production of Ammonium Chloride, specifications, storage and handling.	T1, Ch 3; Pg: 100-103	PPT
9	Review	-	PPT

Content beyond syllabus covered (if any):

* Session duration: 50 min



Sub. Code / Sub. Name: **CH18028 FERTILIZER TECHNOLOGY**

Unit: II

Unit Syllabus: PHOSPHATIC FERTILIZERS

Raw materials; Phosphate rock, sulphur; pyrites etc., processes for the production of sulphuric and phosphoric acids; phosphates fertilizers – ground rock phosphate, bone meal- single super phosphate, triple superphosphate, thermal phosphates and their methods of production, characteristics and specifications.

Objective: Interpret the list of essential nutrients of soil and fertilizer for the plant growth.

Session No *	Topics to be covered	Ref	Teaching Aids
10	Introduction to Phosphatic fertilizers	T1, Ch 2; Pg: 10-11	PPT
11	Raw materials for phosphatic fertilizers – phosphate rock, sulphur, pyrites	T1, Ch 3; Pg: 26 -32	PPT
12	Methods of production of sulphur, characteristics and specifications, storage and handling.	R4, Ch 19, Pg: 320-325	PPT
13	Methods of production of sulphuric acid, characteristics and specifications, storage and handling.	T1, Ch 4; Pg: 69-76	PPT
14	Methods of production of phosphoric acid, characteristics and specifications, storage and handling.	T1, Ch 4; Pg: 77-86	PPT
15	Phosphate fertilizers – ground rock phosphate; bone metal. Methods of production of single super phosphate,	T1, Ch 4; Pg: 123-128	PPT
16	Methods of production of triple super phosphate, specifications, storage and handling.	T1, Ch 4; Pg: 129-130	PPT
17	Methods of production of thermal phosphate, specifications, storage and handling.	T1, Ch 4; Pg: 123-128	PPT
18	Review	-	PPT

Content beyond syllabus covered (if any):

* Session duration: 50 min



Sub. Code / Sub. Name: **CH18028 FERTILIZER TECHNOLOGY**

Unit: III

Unit Syllabus: POTASSIC FERTILIZERS

Methods of production of potassium chloride, potassium schoenite, their characteristics, specifications.

Objective: Identify the raw materials for fertilizer manufacture and discuss characteristics & specifications of fertilizer products.

Session No *	Topics to be covered	Ref	Teaching Aids
19	Methods of production of potassium chloride	T1, Ch 4; Pg: 131-133	PPT
20	Potassium chloride characteristics and specifications	T1, Ch 4; Pg: 131-133	PPT
21	Potassium chloride storage and handling	T1, Ch 4; Pg: 131-133	PPT
22	Methods of production of potassium Schoenite	T1, Ch 4; Pg: 132-134	PPT
23	Potassium Schoenite characteristics and specifications	T1, Ch 4; Pg: 132-134	PPT
24	Potassium Schoenite storage and handling	T1, Ch 4; Pg: 132-134	PPT
25	Applications of Potassium Schoenite	T1, Ch 4; Pg: 132-134	PPT
26	Review	-	PPT
27	Review	-	PPT

Content beyond syllabus covered (if any):

* Session duration: 50 min



Sub. Code / Sub. Name: **CH18028 FERTILIZER TECHNOLOGY**

Unit: IV

Unit Syllabus: COMPLEX AND NPK FERTILIZERS

Methods of production of ammonium phosphate, sulphate, diammonium phosphate, nitrophosphates, urea, ammonium phosphate, mono-ammonium phosphate and various grades of NPK fertilizers produced in the country.

Objective: Classify the fertilizer products and discuss appropriate manufacturing techniques

Session No *	Topics to be covered	Ref	Teaching Aids
28	Introduction to complex and NPK fertilizers	T1, Ch 4; Pg: 139-140	PPT
29	Methods of production of ammonium phosphate, characteristics and specifications, storage and handling.	T1, Ch 4; Pg: 140-144	PPT
30	Methods of production of ammonium sulphate, characteristics and specifications, storage and handling.	T1, Ch 4; Pg: 140-144	PPT
31	Methods of production of di ammonium phosphate, characteristics and specifications, storage and handling.	T1, Ch 4; Pg: 140-144	PPT
32	Methods of production of ammonium nitrophosphate, characteristics and specifications, storage and handling.	T1, Ch 4; Pg: 148-154	PPT
33	Methods of production of urea and mono ammonium phosphate, characteristics and specifications, storage and	T1, Ch 4; Pg: 155-156	PPT
34	Methods of production of various grades of NPK fertilizers.	T1, Ch 4; Pg: 157-163	PPT
35	Review	-	PPT
36	Review	-	PPT

Content beyond syllabus covered (if any):

* Session duration: 50 min



Sub. Code / Sub. Name: **CH18028 FERTILIZER TECHNOLOGY**

Unit: V

Unit Syllabus: MISCELLANEOUS FERTILIZERS

Mixed fertilizers, granulated mixtures; bio fertilizers, nutrients, secondary nutrients and micronutrients; fluid fertilizers, controlled release fertilizers.

Objective: Illustrate the various advantages of miscellaneous fertilizers

Session No *	Topics to be covered	Ref	Teaching Aids
37	Introduction to mixed fertilizers	T1, Ch 4; Pg: 164-169	PPT
38	Classification of fertilizers	T1, Ch 4; Pg: 164-169	PPT
39	Granulated mixtures and examples	T1, Ch 4; Pg: 164-169	PPT
40	Bio – fertilizers	R5, Ch 1; Pg: 1-41	PPT
41	Types of nutrients – primary, secondary and micro nutrients	T1, Ch 1; Pg: 3-6	PPT
42	Fluid fertilizers	R6, Ch 1; Pg: 1-32	PPT
43	Applications of Fluid Fertilizers	R6, Ch 1; Pg: 33-50	PPT
44	Controlled release of fertilizers – Part I	R7, Ch 1; Pg: 1-3	PPT
45	Controlled release of fertilizers – Part II	R7, Ch 1; Pg: 4-18	PPT

Content beyond syllabus covered (if any):

* Session duration: 50 min




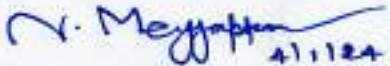
Sub Code / Sub Name: **CH18028 FERTILIZER TECHNOLOGY**

TEXTBOOKS:

1. Handbook on Fertilizer Technology", Fertilizer Association of India, Near JNU, New Delhi 1992.
2. L. J. Carpentire, "New Developments in Phosphate Fertilizer Technology", Elsevier, 1971.

REFERENCES:

1. Sauchelli, V.; "The Chemistry and Technology of Fertilizers", ACS MONOGRAPH No. 148, Reinhold Publishing Cor. New York, 1980.
2. Fertiliser Manual, "United Nations Industrial Development Organisation", United Nations, New York, 1967.
3. Menno, M.G.; "Fertilizer Industry - An Introductory Survey", Higginbothams Pvt. Ltd., 1973.
4. George T Austin, Shreve's Chemical Process Industries' Fifth Edition, Mc Graw Hill Editions, 1975.
5. Biofertilizers for Sustainable Agriculture and Environment, Bhoopander Giri, Ram Prasad, Qiang-Sheng Wu · Springer Nature 2019.
6. Fluid Fertilizer Science and Technology, edited by Derk A Palgrave, Fertilizer science and technology Series, Vol 7. CRC press, 1991.
7. Controlled Release Fertilizers for Sustainable Agriculture, 1st Edition, F.B Lewu Tatiana Volova Sabu Thomas R.K. Rakhimol., Academic Press, 2020

	Prepared by	Approved by
Signature		
Name	Dr. Philip Bernstein Saynik	Dr. N. Meyyappan
Designation	Assistant Professor /CHE	Professor & Head / CHE
Date	04.01.2024	04.01.2024
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD