

135

Format for syllabus development of Skill development course

Title of course: <u>Techniques in Bio-fertilizers Production</u>					
Local Department of HEI to run course					
Broad Area Sector:	<u>Agriculture / Botany</u>				
Sub Sector:	<u>Organic Farming</u>				
Nature of course - Independent / Progressive	<u>Independent</u>				
Name of suggestive Sector Skill Council	<u>ICAR, N. Delhi</u>				
Aligned NSQF level	<u>05</u>				
Expected fees of the course - Free/Paid					
Stipend to student expected from industry					
Number of Seats:					
Course Code:					
Max Marks 100 Minimum Marks	<u>Credits- 03 (1 Theory, 2 Practical)</u>				
Name of proposed skill Partner (Please specify, Name of industry, company etc for Practical training/ internship/OJT)					
Job prospects-Expected Fields of Occupation where student will be able to get job after completing this course in (Please specify name/type of industry, company etc)					
<u>Biofertilizers Production Industries</u>					
Syllabus					
Unit	Topics (Enclosed - Annexure I) Detailed Syllabus	General/Skill component	Theory/ Practical/ OJT/ Internship/ Training	No of theory hours (Total-15 Hours=1 credit)	No of skill Hours (Total-60 Hours=2 credits)
I	<u>Biofertilizer Introduction</u>	<u>General</u>	<u>Theory</u>	<u>03</u>	
II	<u>Character of Rhizobium</u>	<u>Gen/Pract</u>	<u>Theory & Pract</u>	<u>03</u>	<u>05</u>
III	<u>Character of Cyanobacteria</u>	<u>Gen/Pract</u>	<u>Theory & Pract</u>	<u>03</u>	<u>05</u>
IV	<u>Nitrogen fixation Process</u>	<u>SKILL</u>	<u>Theory & Pract</u>	<u>02</u>	<u>10</u>
V	<u>Production of Biofertilizers Techniques</u>	<u>SKILL</u>	<u>Theory & Pract</u>	<u>02</u>	<u>20</u>
VI	<u>Biofertilizer Storage & Handling</u>	<u>SKILL</u>	<u>Theory & Pract</u>	<u>02</u>	<u>20</u>
Suggested Readings: <u>Enclosed - (Annexure - II)</u>					
Suggested Digital platforms/ web links for reading: <u>Enclosed (Annexure - II)</u>					
Suggested OJT/ Internship/ Training/ Skill partner					
Suggested Continuous Evaluation Methods: <u>Written Exam & Practical</u>					
Course Pre-requisites:					
<ul style="list-style-type: none"> • No pre-requisite required, open to all • To study this course, a student must have the subject <u>Science stream</u> in class/12th certificate/diploma • If progressive, to study this course a student must have passed previous courses of this series. 					
Suggested equivalent online courses:					
Any remarks/ suggestions:					
Notes:					
<ul style="list-style-type: none"> • Number of units in Theory/Practical may vary as per need • Total credits/semester-3 (it can be more credits, but students will get only 3credit/ semester or 6credits/ year) • Credits for Theory =01 (Teaching Hours = 15) • Credits for Internship/OJT/Training/Practical = 02 (Training Hours = 60) 					

Name of the course: *Techniques in biofertilizers production*

Unit	Theory Topics	Credits
I	Biofertilizers - Introduction, status and scope.	1 Credits
II	Structure and characteristic features of bacterial biofertilizers- <i>Rhizobium</i>	
III	Cynobacterial biofertilizers- <i>Anabaena, Nostoc</i>	
IV	Nitrogen fixation -Free living and symbiotic nitrogen fixation.	
V	Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertilizers	
VI	Biofertilizers –Storage, handling and shelf life	
	Practical/Training	
	<ul style="list-style-type: none"> • Isolation and purification of <i>Rhizobium</i> • Isolation and purification of Cynobacteria • Identification of important botanicals • Mass multiplication and inoculums production of biofertilizers • Hands on training of biofertilizers applications 	2 Credits
	Total	3 credits

Suggested Book Readings:

1. NIIR Board, (2012) Biofertilizers and Organic Farming, NPCS Publication, New Delhi.
2. Gahalot, D. (2014) जैव उर्वरक उत्पादन मार्गदर्शिका, South India Book Traders, Jodhpur
3. Yadav, A. K. (2004) जैविक खेती, National Organic Farming Center, Gaziabad
4. Rakshit, A and Singh, H. B. (2015) ABC of Organic Farming, Jain Brothers, India
5. Vessey, J.K and Vesmin, L. et-al, Handbook of Microbial Biofertilizers (2006)

Suggested Web Links:

1. <http://heecontent.upsdc.gov.in>
2. <http://swayam.gov.in>
3. <https://icar.org.in>