INSTITUTE	**FACULTY OF AGRICULTURE**
PROGRAM	**BACHELOR OF SCIENCE (Hons.) AGRICULTURE**
SEMESTER	**5**
COURSE TITLE	**GEO-INFORMATICS AND PRECISION FARMING**
COURSE CODE	**16AS0502**
COURSE CREDITS	**2**

Objective:

1 To introduce the basic concepts of geoinformatics and nanotechnology.

2 To create awareness about various applications of geoinformatics and nanotechnology for precision agriculture.

Course Outcomes: After completion of this course, student will be able to:

1 Students will be able to define the basic concepts of remote sensing and geoinformatics.

2 Students will be able to understand tools and techniques of geoinformatics in precision farming.

3 Students will apply crop simulation models and nanotechnology in yield optimization.

4 Students will evaluate the role of geoinformatics in agriculture.

Pre-requisite of course: To provide the knowledge about geo-informatics and precision farming.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
1	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**1** Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture	2
2	**2** Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture	2
3	**3** Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies	1
4	**4** Spatial data and their management in GIS	2

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Contents : Unit	Topics	Contact Hours
5	**5** Remote sensing concepts and application in agriculture; Image processing and interpretation	2
6	**6** Global positioning system (GPS), components and its functions	2
7	**7** Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs	2
8	**8** STCR approach for precision agriculture	2
Total Hours		**15**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**1** Introduction to GIS software, spatial data creation and editing	2
2	**2** Introduction to image processing software	2
3	**3** Visual and digital interpretation of remote sensing images	2
4	**4** Visual and digital interpretation of remote sensing images	2
5	**5** Supervised and unsupervised classification and acreage estimation	2
6	**6** Multispectral remote sensing for soil mapping	2
7	**7** Creation of thematic layers of soil fertility based on GIS	2
8	**8** Creation of productivity and management zones	2
9	**9** Fertilizers recommendations based of VRT and STCR techniques	2
10	**10** Crop stress (biotic/abiotic) monitoring using geospatial technology	2
11	**11** Use of GPS for agricultural survey	2
Total Hours		**22**

Textbook :

1 NA, NA, NA, NA

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References:

1 Geo-informatics and nanotechnology for precision farming, Geo-informatics and nanotechnology for precision farming, S. R. Reddy, Kalyani, 2018

2 Principles and theory of geo-informatics, Principles and theory of geo-informatics, P. R. Gask, Khanna publishing, 2019

3 A textbook on geo-informatics, nanotechnology & precision farming, A textbook on geo-informatics, nanotechnology & precision farming, Tarunkumar Upadhyay, New Delhi Publisher, 2020

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking**
25.00	25.00	20.00	10.00	10.00	10.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the class-rooms

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

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