UNIVERSITY OF SARGODHA

DEPARTMENT OF SOIL & ENVIRONMENTAL SCIENCES, UNIVERSITY COLLEGE OF AGRICULTURE

COURSE OUTLINE SPRING 2020

Course Title: Biochar; Concept and Application

Course Code: SAES-7124

Credit Hours: 3(3-0)

Instructor: Dr. Noor-us-Sabah

Email: noor.sabah@uos.edu.pk

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| **DESCRIPTION & OBJECTIVES** |

After learning this course students will be able to: 1) Biochar and biochar production technology, 2) Impact of biochar on climate change, 3) Economics of biochar production and utilization, 4) Biochar effects on soil nutrient transformations and soil fertility.

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| **READINGS** |

1. Bates, A. 2010. The Biochar Solution: Carbon Farming and Climate Change. New Society Publishers, Gabriola Island, Canada.
2. Lehmann, J. and S. Joseph. 2009. Biochar for Environmental Management: Science and Technology. Earthscan, London, UK.
3. Sohi, S., E. Lopez-Capel, E. Krull and R. Bol. 2009. Biochar, Climate Change and Soil: A review to guide future research. CSIRO Land and Water Science Report 05/09. Centre for Bioenergy and Climate Change, Harpenden, UK.
4. Verheijen, F.G.A., S. Jeffery, A.C. Bastos, M. van der Velde and I. Diafas. 2010. Biochar application to soils: A Critical Scientific Review of Effects on Soil Properties, Processes and Functions. Official Publications, European Communities, Luxembourg.

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| **CONTENTS** |

**Theory**

1. Background and introduction of biochar
2. Physical, chemical and biological properties of biochar
3. Impact of biochar on soil properties
4. Change and stability of biochar in soil
5. Biochar and soil nutrient transformations
6. Biochar and climate change
7. Biochar and emission of greenhouse gases
8. Biochar production technology
9. Economics of biochar production and utilization
10. Socio-economic assessment of biochar projects
11. Some essential concepts for commercial success of Biochar

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| **COURSE SCHEDULE** | | |
| **Week** | **Topics and Readings**: *Give Reading No from your list of readings above and its Page Nos. relevant to the topic(s) covered each week* | **Dates** |
| 1 | Background and introduction of biochar, Lehmann, J. and S. Joseph. 2009. Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 1-9 | 02-03-2020 to  06-03-2020 |
| 2 | Physical, chemical and biological properties of biochar  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 13-29, 85-102 | 09-03-2020 to  13-03-2020 |
| 3 | Socio-economic assessment of biochar projects  Some essential concepts for commercial success of biochar  Economics of biochar production and utilization  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 53-63 | 16-03-2020 to  20-03-2020 |
| 4 | Biochar production technology  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 127-139 | 23-03-2020 to  27-03-2020 |
| 5 | Biochar and emission of greenhouse gases  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages | 30-03-2020 to  03-04-2020 |
| 6 | Biochar and climate change  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 227-243 | 06-04-2020 to  10-04-2020 |
| 7 | ,  Biochar and soil nutrient transformations Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 251-269 | 13-04-2020 to  17-04-2020 |
| 8 | Changes in biochar in soil Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 169-183 | 20-04-2020 to  24-04-2020 |
|  | Mid Test | 27-04-2020 to  01-05-2020 |
| 9 | Stability of biochar in soil  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 183-198 | 04-05-2020 to  08-05-2020 |
| 10 | Biochar and soil nutrient transformations  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 251-263 | 11-05-2020 to  15-05-2020 |
| 11 | Biochar and climate change  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 317-336 | 18-05-2020 to  22-05-2020 |
| 12 | Biochar and emission of greenhouse gases  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 318-321 | 25-05-2020 to  29-05-2020 |
| 13 | Biochar production technology  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 127-130 | 01-06-2020 to  05-06-2020 |
| 14 | Economics of biochar production and utilization  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 341-359 | 08-06-2020 to  12-06-2020 |
| 15 | Some essential concepts for commercial success of biochar  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 393-401 | 15-06-2020 to  19-06-2020 |
| 16 | Socio-economic assessment of biochar projects  Biochar for Environmental Management: Science and Technology. Earthscan, London, UK. Pages 359-371 | 22-06-2020 to  26-06-2020 |
| **RESEARCH PROJECT** | | | |

Preparation of biochar from different stocks

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| Attendance | Presentation | Projects | Quiz test | Total |
| 3 | 3 | 3 | 3 | **12** |
| Mid Test | Sessional | Theory | Total Marks | |
| 18 | 12 | 30 | **60.0** | |
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* *Students are evaluated throughout the semester using tools such as assignments, projects, presentations, tests, quizzes and lab practical etc., according to the necessity of the course and concerned instructor.*
* *At the end of semester, final examination of the course is also held which account for a certain percentage towards the course.*
* *A minimum of 75% attendance is required by the students to be eligible to sit in the final examination. A student having less than 75% of the attendance shall be dropped from the course and have to repeat the course whenever the course is offered again.*
* *In case a student remains absent from the class for seven consecutive lectures, his/her name shall be dropped from the course.*