

Syllabus for

Dual Post Graduate Diploma Course in

Organic Certification

Under the Faculty of Science

By

**Inter University Centre for Organic Farming and
Sustainable Agriculture (IUCOFSA)**

Mahatma Gandhi University

PD Hills PO, Kottayam-686560

in association with

University of Kassel, Germany

1. Preface

Mahatma Gandhi University has established an Inter University Centre for Organic Farming and Sustainable Agriculture (IUCOFSA) to encourage and promote the development of organic farming and sustainable agriculture in the Country. Organic certification addresses a growing worldwide demand for organic food. It is intended to assure quality and to promote ethical practices. With the very high demand for organic food worldwide, the need for third party regulatory certification has become mandatory in many countries. Certification is essentially aimed at regulating and facilitating the sale of organic products to consumers. For organic producers, certification identifies suppliers of products approved for use in certified operations and for consumers, “certified organic” serves as a product quality assurance. Certification by Professionals in Food Safety and standards is a *sine qua non* for export of agricultural product globally. Moreover, trained Indians have excellent employment opportunities both within and abroad as auditors, certifiers, surveyors etc in various Professional agencies and Government organizations.

Organic Certification is intended to assure the quality of food and thereby health to consumers. Eventhough such certification was not necessary in the early days of the [organic movement](#) initiated by small farmers, the global demand for organic food and organic cultivation demand authentication for all agricultural products. Individual certification bodies have their own [service marks](#), which can act as branding to consumers.

As part of its academic initiative and to address the growing demand for trained manpower in Organic Certification, IUCOFSA proposes to start a Dual Post Graduate Diploma Course in Organic Certification in collaboration with Kassel University, Germany. The two semester programme comprise of 32 credits, out of which first 16 credits will be from Mahatma Gandhi University and the remaining 16 credits will be from the Kassel University, Germany. The students will get PG Diploma Certificate from both Mahatma Gandhi University as well as from Kassel University, Germany.

As Kerala export various spices and related materials and products to global market, there is high demand for both the certification facility and the skilled manpower for the same. However, specific training and course for the same is very limited. This indicates the immense scope of the Dual Post Graduate Diploma Course in Organic Certification. By collaborative interaction with Kassel University in the form of a Dual Diploma course, IUCOFSA of Mahatma Gandhi University ensures International competitiveness in Organic Certification process.

The key objectives of the programme are,

- To produce skilled human resource in Quality Management and Organic Certification process to meet the emerging Industrial requirement.
- To establish International collaborative linkage in the area of Organic Farming and Certification to become the part of global organic trend.
- To popularize the Organic Certification process among farmers.
- To ensure quality of food and organic products through Organic Certification and there by ensure the health of consumers

Definitions of terms

‘**Semester**’ means a term consisting of a minimum of 90 working days including examination days distributed over a minimum of 18 weeks with 5 working days in each week.

‘**Credit**’ is the unit by which a course is measured. It is the measure of total number of hours of training received in a course during a semester ;the credit number indicates the total curricular content in terms of number of hours of teaching \ learning in a course during a semester.

‘**Grade**’ indicates the student’s performance level - the level of achievement of student in terms of the score obtained through evaluations and examinations in a course.

1.Student Admission:

1.1. Eligibility and Selection for Dual PG Diploma Course in Organic Certification

- Eligibility- M. Sc. in Science subjects with at least 60% marks
- Number of seats - 15 per batch

- Duration of the programme - 2 semester full time (First semester at Mahatma Gandhi University and the Second Semester at Kassel University, Germany)

1.2. Fee

The fee per student will be **Rs. 1, 00,000/-**. The expenses in connection with visa, foreign travel, stay/ studies abroad, any other fees payable to Kassel University (if any) etc. will have to be borne by the students in the event of the partner University not offering scholarships.

1.3. Dual Diploma

Certificate will be issued as a Dual PG Diploma from both Mahatma Gandhi University, Kerala, India and Kassel University, Germany.

1.4. Programme Structure

The envisaged Dual Post Graduate Diploma in Organic Certification is a two semester programme. The first semester comprises four theory courses, practical and on farm training with a total credits of 16. The second semester has 16 credits consisting of practicals, project and field training which will be offered by Kassel University, Germany.

1.5. Admission will be made by a common admission procedure (CAP) by the University on the basis of a common admission test (CAT)

1.6. Admission may be based on the written test alone or written test and interview or on the basis of the marks obtained in the qualifying examinations as well as the marks obtained in the written test.

2. Evaluation:

2.1. External & Internal Evaluation: Evaluation of the first semester examination shall be done by MG University. Evaluation for all the courses of the second semester examinations of the diploma will be carried out by the University of Kassel Germany.

2.2. Question Paper setting: The Hon. Director shall prepare the panel of question paper setters for the course and will get it approved by the Hon. Vice Chancellor. The Director will make arrangements for getting the question papers set by external experts who shall be selected from the panel approved by the Vice-Chancellor.

2.3. Process of Evaluation: The double valuation of answer scripts in the first semester courses shall be done by external examiner. The Director will make arrangements for the evaluation of the answer scripts. The second semester valuation will be carried by Kassel University, Germany.

2.4. Internal Assessment: The student's attendance and classroom performance as well as the feedback received from tests, tutorials, assignments and term papers shall form the basis for internal assessment. The internal assessment will be a continuous assessment that accounts for 50% of the evaluation in both theory and practical.

2.5. Grading System: The grading system followed is that of relative grading on a ten-point scale. The following table indicates the performance range and the relative value of the grades (grade points) on the scale.

Letter Grade	Performance	Grade Point
O	Outstanding	10
A Plus	Excellent	9
A only	Very good	8
B Plus	Good	7
B only	Above Average	6
C	Average	5
P	Pass	4
F	Fail	0
Ab	Absent	0

2.6. Minimum grade for passing in a course or programme: Minimum for a pass in a course is 'P' Grade.

2.7. Publication of Results:

Results of first semester from MG University will be given to Kassel University and similarly results of second semester will be transferred to MG University, From the shared results, both Universities will provide separate certificates.

3. Re-appearance and improvement Examinations

3.1. Candidates in the 1st or 2nd semesters who have secured a letter grad of ‘P’, ‘F’ or ‘Ab’ in any of the courses can reappear for exams course-wise along with the next immediate batch provided the candidate has applied for the same and paid the required fee.

4. Percentage Equivalence of Grade:

Range of % of Marks	Grade Letter	Grade Point
95-<100	O	10
85-<95	A Plus	9
75-<85	A only	8
65-<75	B Plus	7
55-<65	B only	6
45-<55	C	5
40-<45	P	4
<40	F	0
Absent	Ab	0

1.Overview

Programme Structure

Semester	Course Code	Course	Category	Credit	Total Credit
I Mahatma Gandhi University, Kerala, India	OF001	Fundamentals of Agriculture	Theory	3	16
	OF002	Organic Certification Process	Theory	4	
	OF003	Instrumentation and Analytical Techniques	Theory	4	
	OF004	Soil and Agriculture Residue Analysis (Lab course)	Practical	3	
	OF005	On farm training	Field visit	2	
II Kassel University, Germany	OF006	Food Quality Analysis and Food Ingredient Analysis	Practical	4	16
	OF007	Microbial Analysis	Practical	4	
	OF008	Field Training on Organic Product and Report Preparation	Field visit	2	
	OF009	Project	Project	6	
Total Credit					32

SEMESTER I

at Mahatma Gandhi University

1. OF001 Course: Fundamentals of Agriculture

Credit -3

Objectives of the course

1. To introduce the importance of agriculture, food security and sustainable agriculture.
2. To introduce fundamentals of live stock farming and animal behavior
3. To familiarize with
 - a) Soil forming materials, soil profile and classification
 - b) Nutrient recycling through manures and biofertilizers
 - c) Principles and concept of organic farming system
4. To familiarize with biopesticides and plant extracts
5. To introduce organic perspectives conventional organic agriculture and National Organic Policy

Unit I - Fundamentals of Agriculture

Brief history of agricultural development, Chronological agricultural technology development in India, Agronomy and its scope, Importance of agriculture in India and Kerala, Seeds and Methods of sowing/ planting, tillage and tith, Agronomic classification of crops, Crop nutrition, manures and fertilizers, Major farming systems approach, Food security, Sustainable agriculture, Planting geometry and its effects on growth and yield, Climate requirements, Cultural practices, Harvesting and processing of region crops, Agriculture season in India, Role of water in soil and plants, methods of irrigation, Water management, Rain fed and irrigated agriculture, Dry land agriculture, Concepts of weed management and crop rotation-principles and methods

Identification of Cereals, Millets, Pulses, Tuber crops vegetables, Major cereal cash crops, Identification of manure, Fertilizers, Fertilization with green manure crops, Cover crops, Fundamentals of Livestock farming, animal behavior, Poultry management, Basics of Apiculture, Mushroom cultivation, Dairy industry, Nutritive value of milk, Organic milk production, Organic meat production

Unit II - Basics of Soil Science

Soil genesis, Processes and factors of soil formation, Soil Profile, Soil classification and soils of India, Components of soil, Soil-physical properties, texture, structure, density, porosity, color, consistence and plasticity, Soil factors- temperature, pH, acidity and alkalinity and buffering effect, Soil nutrient source and availability, productivity and fertility, Organic manure, Biofertilizers, nutrient recycling through manures, Soil management, Microorganisms of the soil and their importance, Microbial analysis of soil, Crop residues, Fertilizer- types, effect and management of fertilizers. Pesticide toxicity and its residual effects, Acute and chronic toxicity, Pesticide labels and labeling, Residual

toxic level, Methods to remove pesticide residuals and waiting period formulations, Heavy metal contamination in soil and its toxicity

Unit III - Organic Agriculture

Organic concepts and its origin, Organic perspectives-changing its time, The world of organic agriculture, National and International status, Principles and Concept of organic farming, Scope of organic farming in Kerala, Conventional organic agriculture, Organic plant nutrient management, Organic plant protection and crop production, Areas specific organic packages. Effective Microorganisms (EM) solutions for agriculture, Agencies and institutions related to organic agriculture, Requirements for organic farming, Farm components for an organic farm, National programme for organic production and operation structure, National organic policy, Familiarization of plant protection equipments, Plant protection through bioagents and traps, Insect growth regulation as a system approach, Repellants, Pheromone, Biocontrol agents for plant pathogen, Integrated Pest Management practices.

Unit IV - Products for Organic agriculture

Components and field application of Green manuring, Plant extracts, Biofertilizers and Biopesticides, Standards for organic inputs- fertilizers, Composting methods, Bulky organic manures, Organic preparations, Organic insecticides, Organic fungicides, Commercially available organic products.

2. OF002 Course: Organic Certification Process

Credit -4

Objectives of the course

1. To introduce Organic Certification process and procedure
2. To introduce Organic Agriculture industry and Organic products

3. To introduce International Standards for Organic Certification

Unit I - Regulation of Organic certification

Farm economy: Basic concept of economics, Basic production principles, Reducing expenses, ways to increase returns, Marketing, Imports and exports, Organic certification process, Certification, Production, Processing, Storage, Nutritive labeling, Codex alimentarius, Product labeling, Certification around the world, Entrepreneurship development-concept, characteristics, approaches, need for entrepreneurship, Government regulations, Certified organic foods, Branding of organic products, Shipping.

Unit II - Inspection and Certification process

Inspection and certification agencies, Annual surveillance and review of inspection, Inspection visit and reports, Methods and frequency, Analysis and residuals testing, Inspection regime for part conversion and parallel production, Inspection for use of Genetically Engineered Products, Procedure for implementation of internal control system, certification process, mandatory checks to be undertaken by the authorized inspection and certification agency during inspection.

Unit III - Sustainability standards and indicators and Accreditation agencies

International Standards, Basic principles of organic marketing, marketing functionaries, market surveys, contract terms, standardization and grading, marketing and export of agriculture products, Case study.

Indian certification agencies- National Accreditation Board for Testing and Calibration Laboratories (NABL), Tamil Nadu Organic Certification Department (TNOCD), Agricultural and Processed food products Export Development Authority (APEDA), Spice Board, Coffee Board, Tea Board.

International certification agencies- Argencert, California Certified Organic Farmers(CCOF), International Federation of Organic Agriculture Movements (IFOAM) and standards. The Ecological Farming Association, Organic Farming Research

Foundation (OFRF), Organic trade Association, Community Alliance with Family Farmers, Institute for Market Ecology (IMO), SKAL, ECOCERT INTERNATIONAL, DEMETER.

Unit IV - Procedure for Accreditation

Guidelines for Organic Certification- General Requirement for Certification, Application for Certification, Review of Application, Scheduling of Inspection, Verification during Inspection, Group Certification Standards, Continuation of Certification.

3. OF003 Course: Instrumentation and Analytical Techniques Credit -4

Objectives of the course

1. To introduce basic principle of instruments used in Organic Certification Process
2. To introduce methods used for sample collection and analysis
3. To introduce analysis of chemical constituents and food ingredients

Unit I - Working principles of instruments I

Basic principles of Spectroscopy, Electromagnetic spectrum, UV Spectrophotometer, FT-IR, NMR Spectroscopy, Mass spectrometer, Raman Spectroscopy, Microwave digester, ICP-MS

Unit I - Working principles of instruments II

Chromographic analysis- Basic principle and applications of Thin layer chromatography, Gel filtration, Ion exchange chromatography, Affinity chromatography, HPLC, GC-MS, and LS-MS/MS

Unit III- Sample analysis

Types of samples analyzed, Sample- analysis, methods, sampling procedures, sample preparation, Evaluation of analytical data-accuracy and precision, sources of errors, specificity, sensitivity and detection limits, regression analysis, reporting results

Unit IV- Analysis of chemical constituents and food ingredients

Analysis of chemical constituents, their characterization and significance- moisture, ash, minerals, lipids, fat, proteins, fibre, titratable acidity, starch, reducing sugars

Analysis of food ingredients, Residues, Analysis of vitamins, pigments, flavors, extraneous matter, pesticides, heavy metals and mycotoxins, Microscopic analysis, other methods- potentiometry, enzymatic, immunoassays, thermal analysis, Analysis of genetically modified foods.

4. OF004 Course: Lab course I - Soil and Agriculture Residue Analysis Credit -3

Objectives of the course

1. To introduce lab methods used for analysis of soil and agricultural sample
2. To get hands-on experience in sample analysis

Unit I - Nutrient analysis

Sampling, Soil preparation, Soil organic matter content, Analysis of total and available plant nutrients- Analysis of Organic Carbon, Nitrogen and other micro-nutrients, Flame-photometry and atomic absorption spectroscopy, ICP-MS analysis

Unit II - Pesticide residue analysis

Principles of colorimetry, Analysis of plants for essential elements, Pesticide residue analysis, GC-MS, LC-MS

Unit III

Agriculture Residue Analysis, Biomass and, Animal Feed Analysis, GC-MS, LC-MS

5. OF005 On Farm Training Credit -2

Interaction with farmers, field visit to study organic cultivation, methods of collecting organic products, field inspection and packaging of organic products.

SEMESTER II
at Kassel University

6. OF006 Course: Food Quality Analysis and Food Ingredient Analysis Credit -4

Objectives

1. To introduce methods used in organic certification
2. To introduce pesticide detection methods, techniques and instruments

Unit I- Organic certification

Organic certification of food and agricultural products, Sample collection, Analysis of chemical constituents, Analysis on moisture, ash, minerals, lipids, fat, proteins, fibre, titratable acidity, starch, reducing sugars

Unit II- Spectroscopic and chromatographic methods

Spectroscopic and chromatographic analysis of foods, Uv-Vis spectroscopy, HPLC

Unit III - Enzymatic and immunological methods

Enzymatic and immunoassays of food, thermal analysis of food

Unit IV- Pesticide detection

Detection of residues of pesticides, antibiotics, heavy metals and preservatives, Milk procurement, Analysis of milk, Markers for identification of organic food, Nutritional analysis, Artificial sweetening agents detection in food

7. OF007 Course: Microbial Analysis

Credit -4

Objectives

1. To introduce various microbiological methods
2. To introduce advanced methods for microbial identification
3. To introduce methods for toxin detection

Unit I Microbiological analysis of agricultural products

Microbial analysis of agricultural products- Isolation of microbes from food samples

Unit II– Microbial identification

Identification of common food borne pathogens, culture based, biochemical, molecular and automated methods

Unit III - Microbial quality analysis

Evaluation of microbial quality of food, microbial analysis of agriculture products, food, milk

Unit IV –Microbial toxin analysis

Detection of fungal toxins- aflatoxin, ochratoxin, different methods for toxin detection

8. OF008 Course: Field Training on Organic Product and Report Preparation

Credit -2

9. OF009 Course: Project related to organic products and its analysis Credit -6

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