AMRITA SCHOOL OF MEDICINE
Amrita Centre for Allied Health Sciences

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CURRICULUM
MSc Clinical Nutrition and Food Science (With effect from 2024 onwards)
SPIRITUAL PRINCIPLES IN EDUCATION

“In the gurukulas of ancient rishis, when the master spoke it was love that spoke; and at the receiving end disciple absorbed of nothing but love. Because of their love for their Master, the disciples’ hearts were like a fer-tile field, ready to receive the knowledge imparted by the Master. Love given and love received. Love made them open to each other. True giving and receiving take place where love is present. Real listening and ‘sradd-ha’ is possible only where there is love, otherwise the listener will be closed. If you are closed you will be easily dominated by anger and re-sentment, and nothing can enter into you”.

“Satguru Mata Amritanandamayi Devi”
Introducing AIMS

India is the second most populous nation on earth. This means that India’s health problems are the world’s health problems. And by the numbers, these problems are staggering: 41 million cases of diabetes, nearly half the world’s blind population, and 60% of the world’s incidences of heart disease. But behind the numbers are human beings, and we believe that every human being has a right to high-quality healthcare.

Since opening its doors in 1998, AIMS, our 1,200 bed tertiary care hospital in Kochi, Kerala, has provided more than 4 billion rupees worth of charitable medical care; more than 3 million patients received completely free treatment. AIMS offers sophisticated and compassionate care in a serene and beautiful atmosphere, and is recognized as one of the premier hospitals in South Asia. Our commitment to serving the poor has attracted a dedicated team of highly qualified medical professionals from around the world.

The Amrita Institute of Medical Sciences is the adjunct to the term “New Universalism” coined by the World Health Organization. This massive healthcare infrastructure with over 3,330,000 sq. ft. of built-up area spread over 125 acres of land, supports a daily patient volume of about 3000 outpatients with 95 percent inpatient occupancy. Annual patient turnover touches an incredible figure of almost 800,000 outpatients and nearly 50,000 inpatients. There are 12 super specialty departments, 45 other departments, 4500 support staff and 670 faculty members.

With extensive facilities comprising 28 modern operating theatres, 230 equipped intensive-care beds, a fully computerized and networked Hospital Information System (HIS), a fully digital radiology department, 17 NABL accredited clinical laboratories and a 24/7 telemedicine service, AIMS offers a total and comprehensive healthcare solution comparable to the best hospitals in the world. The AIMS team comprises physicians, surgeons and other healthcare professionals of the highest caliber and experience.
AIMS features one of the most advanced hospital computer networks in India. The network supports more than 2000 computers and has computerized nearly every aspect of patient care including all patient information, lab testing and radiological imaging. A PET (Positron Emitting Tomography) CT scanner, the first of its kind in the state of Kerala and which is extremely useful for early detection of cancer, has been installed in AIMS and was inaugurated in July 2009 by Dr. A. P. J. Abdul Kalam, former President of India. The most recent addition is a 3 Tesla Silent MRI.

The educational institutions of Amrita Vishwa Vidya Peetham, a University established under section 3 of UGC Act 1956, has at its Health Sciences Campus in Kochi, the Amrita School of Medicine, the Amrita Centre for Nano sciences, the Amrita School of Dentistry, the Amrita College of Nursing, and the Amrita School of Pharmacy, committed to being centres of excellence providing value-based medical education, where the highest human qualities of compassion, dedication, purity and service are instilled in the youth. Amrita School of Ayurveda is located at Amritapuri, in the district of Kollam. Amrita University strive to help all students attain the competence and character to humbly serve humanity in accordance with the highest principles and standards of the healthcare profession.
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</table>
Part I
Rules and Regulations
I.2. Medium of Instruction:

English shall be the medium of instruction for all subjects of study and for examinations.

II.3. Eligibility:

Candidates for admission to the M.Sc., CLINICAL NUTRITION and FOOD SCIENCE DEGREE COURSE UNDER ALLIED HEALTH SCIENCES should have passed Degree in any of the following courses from a recognized University B.Sc., Nutrition Dietetics and Food Service Management/ Food Science and Nutrition/ Clinical Nutrition and Dietetics/ Food Service Management and Dietetics/ Home Science (with majors in Nutrition and Dietetics)/ Human Science (with majors in Nutrition and Dietetics)

II. General Rules:

Admissions to the courses will be governed by the conditions laid down by the University from time to time and as published in the Regulations for admissions each year.

I.1. Duration of the Course

Duration details are mentioned under clause No.I of this booklet. Duration of the course:

Mentioned under clause no. I

Duration of the Course : 2 Years

Weeks available per year: 52 weeks

Holidays : 5 weeks

Examination (including preparatory) : 6 weeks Extra-curricular activities : 2 weeks available : 39 weeks

Hours per week : 40 hours

Hours available per academic year : 1560 (39 weeks x 40 hours)

Internship wherever specified are integral part of the course and needs to be done in Amrita Institute of Medical Sciences, Centre for Allied Health Sciences, Kochi itself.
II.2. **Discontinuation of studies**

Rules for discontinuation of studies during the course period will be those decided by the Chairman / Admissions, and is published in the “Terms and Conditions” every year.

II.3. **Educational Methodology**

Learning occurs by attending didactic lectures, as part of regular work, from co-workers and senior faculty, through training offered in the workplace, through reading or other forms of self-study, using materials available through work, using materials obtained through a professional association or union, using materials obtained on students own initiative, during working hours at no cost to the student.

II.4. **Academic Calendar**

**SEMESTER**  **SCHEME**

**FIRST SEMESTER**

Commencement of classes  – August
Sessional exam  – October
Pre-University Examination - 01 January – 15 January
University exam (with practical) – 15 January - 30 January

**SECOND SEMESTER**

Commencement of classes  – February
Sessional exam  – May
Pre-University Exam - 01 July – 15 July
University exam (with practical) – 15 July – 30 July

**THIRD SEMESTER**

Commencement of classes  – August
Sessional exam  – October
Pre-University Examination - 01 January – 15 January
University exam (with practical) – 15 January - 30 January

**FOURTH SEMESTER**

Commencement of classes  – February
Sessional exam  – May
Pre-University Exam - 01 July – 15 July
University exam (with practical) – 15 July – 30 July
III. Examination Regulations:

III.1. Attendance: 75% of attendance (physical presence) is mandatory. Medical leave or other types of sanctioned leaves will not be counted as physical presence. Attendance will be counted from the date of commencement of the session to the last day of the final examination in each subject.

III.2. Internal Assessment:

1. Regular periodic assessment shall be conducted throughout the course. At least one sessional examination in theory and preferably one practical examination should be conducted in each subject. The Pre-University examination should be of the same pattern of the University Examination. The marks obtained in assignments / oral / viva / practical shall be taken to calculate the internal assessment.

2. A candidate should secure a minimum of 50% marks in the internal assessment in each subject (separately in theory and practical) to be eligible to appear for the University examination.

3. The internal assessment will be done by the department once during the course and final model exam which will be the same pattern of University Examination.

4. Each student should maintain a logbook and record the procedures they do and the work patterns they are undergoing. It shall be based on periodical assessment, evaluation of student assignment, preparation for seminar, clinical case presentation, assessment of candidate’s performance in the sessional examinations, routine clinical works, logbook and record keeping etc.

5. Day to day assessment will be given importance during internal assessment and weightage for internal assessment shall be 20% of the total marks in each subject.
6. Sessional examination as mentioned above and the marks secured by the students along with their attendance details shall be forwarded to the Principal.

**III.3. University Examinations:**

- University Examination shall be conducted at the end of every semester.
- A candidate who satisfies the requirement of attendance and internal assessment marks, as stipulated by the University shall be eligible to appear for the University Examination.
- One semester will be 6 months including the days of the University Examination. Year will be counted from the date of commencement of classes, which will include the inauguration day.
- The minimum pass for internal assessment is 50% and for the University Examination is 50%. However, the student should score a total of 50% (adding the internal and external examination) to pass in each subject (separately for theory and practical)
- If a candidate fails in either theory or practical paper, he/she has to re-appear for both the papers (theory and practical)
- Maximum number of attempts permitted for each paper is five (5) including the first attempt.
- The maximum period to complete the course shall not exceed 4 years.
- Number of candidates for practical examination should be maximum 12 to 15 per day
- One internal and external examiner should jointly conduct the theory evaluation and practical examination for each student during the final semester.

**III.4. Eligibility to appear university Examination:**

A student who has secured 50% marks for Internal Assessment is qualified to appear for University Examination provided he/she satisfies percentage of attendance requirement as already mentioned at the III (1) of the clause.
III.5. Valuation of Theory – Revaluation Papers:

1. Valuation work will be undertaken by the examiners in the premises of the Examination Control Division in the Health Sciences Campus.

2. There will be Re-Valuation for all the University examinations. Fees for re-valuation will be decided by the Principal from time to time.

3. Application for revaluation should be submitted within 10 days from date of result of examination declared and it should be submitted to the office with payment of fees as decided by the Principal.

III.6. Supplementary Examinations:

Every regular University examination will be followed by a supplementary examination, which will normally be held within four to six months from the date of completion of the regular examination.

As stipulated under clause No. 2 under Internal Assessment, HOD will hold an internal examination three to four weeks prior to the date of the University Examination. Marks secured in the said examination or the ones secured in the internal examination held prior to the earlier University Examination whichever is more only will be taken for the purpose of internal assessment. HODs will send such details to the Principal ten days prior to the date of commencement of University examination.

Students who have not passed / cleared all or any subjects in the University examination will be permitted to attend the next semester classes. However, he / she can appear for the final semester University Examination, only if he / she clear all the subjects in the previous semester University examinations.

Same attendance and internal marks of the regular examination will be considered for the supplementary examination, unless the HOD furnishes fresh internal marks and attendance after conducting fresh examination.
Students of supplementary batches are expected to prepare themselves for the University Examinations. No extra coaching is expected to be provided by the Institution. In case at any time the Institution has to provide extra coaching, students will be required to pay fees as fixed by the Principal for the said coaching.

III.7. Rules regarding carryover subjects:
A candidate will be permitted to continue the next semester of the course even if he/she has failed in the previous semester University Examinations. However, he / she can appear for the final semester University Examination, only if he / she clear all the subjects in the previous semester (first, second and third semester) University examinations.

IV. Criteria for Pass in University Examination - Regulations:

IV.1. Eligibility criteria for pass in University Examination:
In each of the subjects, a candidate must obtain 50% in aggregate for a pass and the details are as follows:

- A separate minimum of 50% for Internal Assessment
- 50% in Theory & 50% in Oral / Viva
- A separate minimum of 50% in aggregate for Practical / Clinics (University Examinations)
- Overall 50% is the minimum pass in subject aggregate (University Theory + Viva / Oral + Practical + Internal Assessment)

IV.2. Evaluation and Grade:
1. Minimum mark for pass shall be 50% in each of the theory and practical papers separately (including internal assessment) in all subjects.

2. A candidate who passes the examination in all subjects within aggregate of 50% marks and above and less than 65% shall be declared to have passed the examination in the second class.
3. A candidate who passes the examination in all subjects in the first attempt obtaining not less than 65% of the aggregate marks for all the three years shall be declared to have passed the examination with First Class.

4. A candidate who secures an aggregate of 75% or above marks is awarded distinction. A candidate who secures not less than 75% marks in any subject will be deemed to have passed the subject with distinction in that subject provided he/she passes the whole examination in the first attempt.

5. A candidate who takes more than one attempt in any subject and pass subsequently shall be ranked only in pass class.

6. A Candidate passing the entire course is placed in Second class / First class / Distinction based on the cumulative percentage of the aggregate marks of all the subjects in the I and final University Examinations.

7. Rank in the examination: - Aggregate marks of all two-year regular examinations will be considered for awarding rank for the M.Sc. Graduate Examination.

V. General considerations and teaching / learning approach:

There must be enough experience to be provided for self-learning. The methods and techniques that would ensure this must become a part of teaching-learning process. Proper records of the work should be maintained which will form the basis for the students’ assessment and should be available to any agency that is required to do statutory inspection of the school of the course. Research Activities:

The candidate has to maintain a record of research activities done by him/her and keeps a project record (to be submitted to the Principal before Part II examination).
Credits
The term credit is used to describe the quantum of syllabus for various programmed in terms and hours of study. It indicates differential weightage given according to the contents and duration of the courses in the curriculum design.

The minimum credits requirement for a M.Sc Clinical Nutrition programme shall be 97.

Credits will be assigned on the basis of the lectures (L) / tutorials (T) / Clinical Rotation (CR) / laboratory work (P) / Research Project (RP).

L - One credit for one-hour lecture per week (1 credit = 15 hours)
T/P - One credit for every two hours of laboratory or practical (1 credit = 30 hours)
CT - One credit for three hours of clinics (1 credit = 45 hours)
CR - One credit for two hours of clinical rotation (1 credit = 30 hours)
RP - One credit for two hours of dissertation or Project work per week - max credit 20-25 (1 credit = 30 hours)

<table>
<thead>
<tr>
<th></th>
<th>Lecture -L</th>
<th>Tutorial -T</th>
<th>Practical -P</th>
<th>Clinical Training/Rotation - CR</th>
<th>Research Project - RP</th>
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<tr>
<td>1 Credit</td>
<td>1 Hour</td>
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<td>45 Hours</td>
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The UGC recommended 10-point grading system with the following letter grades are given below:

**CBCS Grading System** - Marks equivalence table of Grades and Grade Points
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<th>Letter Grade</th>
<th>Grade Point</th>
<th>Range of Marks</th>
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<tbody>
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<td>O (Outstanding)</td>
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<tr>
<td>A+ (Excellent)</td>
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<td>70-85</td>
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<tr>
<td>A (Very Good)</td>
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<td>60-69</td>
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<tr>
<td>B+ (Good)</td>
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<td>55-59</td>
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<td>B Pass</td>
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<td>F (Fail)</td>
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A student obtaining Grade F/Ab shall be considered failed and will be required to reappear in the examination.
### SCHEME OF CURRICULUM AND EXAMINATION

#### FIRST YEAR SEMESTER I

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<tr>
<th>Course number</th>
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<th>Category</th>
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<th>Credits</th>
<th>Lecture</th>
<th>Tutorial/Study hours</th>
<th>Practicals/research project</th>
<th>Total Hours</th>
<th>Attendance (%)</th>
<th>Continuous Internal Assessment</th>
<th>Theory (b)</th>
<th>Practical/viva (c)</th>
<th>End semester Assessment</th>
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#### FIRST YEAR SEMESTER II

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Explanation:
- **Course number**
- **Course code**
- **Category**
- **Course Title**
- **Credits**
- **Lecture**
- **Tutorial/Study hours**
- **Practicals/research project**
- **Total Hours**
- **Attendance (%)**
- **Continuous Internal Assessment**
- **Theory (b)**
- **Practical/viva (c)**
- **End semester Assessment**
- **Grand Total**
# SECOND YEAR SEMESTER III

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<th>Tutorial/Clinical training</th>
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# SECOND YEAR SEMESTER IV

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PART II
SYLLABUS
1. Medical Nutrition Therapy for Anaemia: Iron – related blood disorders - Iron deficiency anaemia; Hemochromatosis; Iron toxicity. Megaloblastic Anaemias - Pernicious and other Vitamin B12 deficiency anaemias; Folic acid deficiency anaemia. Other Nutritional Anaemias - Copper deficiency anaemia; Anaemia of protein-energy malnutrition; Sideroblastic(pyridoxine-responsive) anaemia. Non-nutritional Anaemias - Sports anaemia (hypochromic microcytic transient anaemia); Anaemia of pregnancy; Anaemia of inflammation, infection or malignancy; Sickle cell anaemia; Thalassemias

2. Medical Nutrition Therapy for gastrointestinal disorders - Disorders of the oesophagus; Disorders of the stomach; Common Intestinal problems; Diseases of the small intestine; Intestinal Brush-Border Enzyme deficiencies; Inflammatory Bowel Diseases; Disorders of the large intestine.

3. Medical Nutrition Therapy for pancreatic and liver disorders - Physiology and functions of the liver; Laboratory assessment of liver function; Diseases of the liver; Physiology and functions of the gall bladder; Diseases of the gall bladder; Physiology and functions of the exocrine pancreas

4. Medical Nutrition Therapy for cardiovascular disorders - Prevalence and incidence; Pathophysiology and etiology; Atherosclerosis; Dietary lipids and coronary heart disease; Plasma lipoproteins; Lipoprotein metabolism; Dietary factors and coronary heart disease; Diet and hypertension; Diet and stroke; Diet and peripheral vascular disease; Diet and chronic heart failure; Micronutrients and cardiovascular disease

5. Medical Nutrition Therapy for pulmonary disorders - Relationships between nutrition and the pulmonary system; Overview of medical nutrition therapy in pulmonary disease; Aspiration; Asthma; Chronic obstructive pulmonary disease; Cystic fibrosis; Lung cancer; Pneumonia; Respiratory failure; Tuberculosis

6. Medical Nutrition Therapy for renal disorders: Physiology and function of the kidneys; Renal disease; Glomerular diseases; Diseases of the tubules and interstitium; Progressive nature of renal disease; End-stage renal disease; Nephrolithiasis
7. **Medical Nutrition Therapy for endocrine disorders** – Pathophysiology, diagnostic and screening criteria, management of diabetes mellitus, diabetes and age-related issues, implementing nutrition, self-management, acute complications, long-term complications, preventing diabetes, hypoglycemia of non-diabetic origin

8. **Nutritional care for weight management**: body weight components, regulation of body weight; weight management throughout life; weight imbalance: overweight and obesity; management of obesity in adults; common problems encountered in obesity management; weight management in children; weight imbalance: excessive leanness.

9. **Medical Nutrition Therapy for febrile and surgical conditions**: Fevers of short duration, chronic fevers and infections, pre-operative and post-operative nutrition

10. **Nutritional aspects of disease affecting the skeleton** – Overview of mineral ion homeostasis and bone metabolism; age-appropriate biochemical reference ranges; pharmaceutical agents commonly used in bone disease; rickets/osteomalacia; mineral ion homeostasis in preterm infants; corticosteroid-induced bone disease; osteoporosis associated with chronic disease; anorexia nervosa; senile osteoporosis

11. **Medical Nutrition therapy for metabolic disorders** – Newborn screening; goals of medical nutrition therapy; disorders of amino acid metabolism; disorders of organic acid metabolism; disorders of urea cycle metabolism; disorders of carbohydrate metabolism; glycogen storage diseases; disorders of fatty acid oxidation; role of nutritionist in medical nutrition therapy for metabolic disorders

12. **Medical Nutrition Therapy for neurological disorders**: Neurologic disease classification, nervous system wiring and lesions, medical nutrition therapy, problems with procurement of food, nutritional deficiencies or excesses

**Reference Books:**


5. Gottschlisch M – “The science and practice of nutrition support”


1. Carbohydrate Metabolism:

2. Metabolism of Proteins & Amino Acids:
Principles and methods for the estimation of Urea, creatine, creatinine, Total protein and Albumin

3. Common Inborn Errors of Metabolism:
Disorders of Carbohydrates metabolism - Glycogen storage diseases, galactosemia, fructose & Lactose intolerance.
Disorders of lipid metabolism - DYSLIPOPROTEINEMIA- Hypolipoproteinaemia, Hyper lipo proteinemia, Atherosclerosis and sphingolipidosis.
Disorders of Amino Acid metabolism, Cystinuria, Homoystinuria, Cystathionuria, Phenyl ketonuria, Alkaptonuria, Albinism. Maple Syrup Urine diseases, Hartnups’s diseases.
Disorders of Nucleic acid metabolism - Gout, Lesch-Nyhan Syndrome, Laboratory diagnosis of Inborn errors of metabolism

4. Vitamins and Co-Enzymes:
Vitamins- water Soluble-Chemistry, sources, RDA, Biochemical role, Deficiency and assay
Vitamins Fat soluble-chemistry, sources, RDA, biochemical role, Deficiency, toxicity and assay, Estimation of Vitamin A, C, E and B.
5. C.S.F and Other Body Fluids:
Physical and chemical examinations. Estimation of sugar, protein and chloride.
Composition and Chemical analysis of Synovial, Pleural, Peritoneal, Pericardial, Amniotic fluid etc., Estimation of sugar, protein and chloride in CSF Common Laboratory methods, estimation and its interpretation of Glucose, protein, Cholesterol (total & HDL), Uric Acid, Creatine, Creatinine, Urea, Triglyceride, phospholipids, Total lipids, Glycosylated Haemoglobin and tests for inborn errors of Amino acid metabolism.

6. Enzymes:
Classification, Co-enzymes, Co factors, Mechanism of enzyme action, factors affecting in Enzyme action, Enzyme Kinetics, Michaelis Menton constant, Enzyme Inhibition, Regulatory enzymes, Immobilization of enzymes.

7. Clinical Enzymology

8. Mineral Metabolism and Estimation
Calcium, phosphate, magnesium, sodium, potassium, Chloride, Iron, Copper, Zinc, Iodine: metabolism and disorders. Methodology of the estimation of the above minerals in blood, plasma and other body fluids

9. Function Tests
Liver function tests: Disease of the liver-Jaundice,acute and chronic hepatitis, Cirrhosis, Cholestasis etc ., Kidney function tests -Glomerular function and measurements, clearance tests, Tubular function tests, clinical syndromes, Gastro intestinal function tests . Collection of Gastric Juice. Tests for Gastric Function, Stimulation methods-Test Meals, Measurements of other Gastric Components, Malabsorption, Tests for occult blood in faces, Tests for malabsorption studies, Schilling test, D-xylose absorption tese, faecal fat estimation. -
Estimation of free and total acidity. Pancreatic function tests - Tests in Pancreatic diseases, Serum Enzymes and Urinary Enzymes - Direct stimulation tests and indirect stimulation of the pancreas- Sweat tests. Thyroid function tests- hyperthyroidism and hypothyroidism. Gonadal function tests – disorders in males and females. Fetal placental function tests - Hemolytic disease of New-borns, biochemical assay for fetal lung maturity, Biosynthesis of Estriol, measurements and clinical applications.

10. Acid-Base Balance
1. **Introduction to research and types of research:** Meaning of research, objectives of research, significance of research, research process, criteria of research

2. **Defining research problem:** Selection of the problem, necessity of defining the problem, techniques in selecting a problem, examples

3. **Research design:** Meaning of design, need for a research design, different research designs, basics of experimental designs, developing research plan, strengths and weakness, experimental, quasi experimental and correlational

4. **Sampling Design:** Sample and universe, sampling, different methods of sampling, selection of a random sample, census and survey

5. **Measurement and scaling techniques:** Measurement in research, measurement tools, scaling and scaling techniques

6. **Data collection:** Methods of data collection, questionnaires/schedule, selection of appropriate method for data collection, guidelines for constructing questionnaire, guidelines for interviewing, sample questionnaires

7. **Data Analysis:** Introduction to data analysis, demo with SPSS software

8. **Dissertation/Report writing:** Technique of interpretation, report writing/dissertation writing, how to critique an article

**Biostatistics/Statistics**

1. **Introduction:** Basic concepts (data, sources of data, variable), objectives, role of biostatistics/statistics, summary

2. **Descriptive Statistics:** Ordered array, frequency distribution, measures of central tendency, measures of dispersion, summary

3. **Basic probability concepts:** Introduction, elementary properties of probability, probability distributions (binomial, poisson, normal distribution) applications
4. **Sampling**: Sampling distributions, sample means and difference between two means, sample proportion and difference between two sample proportion, sampling, sampling methods (SRS, Sys, SrRs, cluster sampling), sample size and sample calculation

5. **Testing of hypothesis and estimation**: Testing of hypothesis, Type I and Type II error (critical region and power of the test), applications of testing of hypothesis, confidence interval for population mean, confidence interval for population proportion.

6. **Analysis of variance (ANOVA)**: I-Introduction, CRD, RBD, LSD, factorial experiment, Summary

7. **Correlation and Regression**: Introduction, correlation, correlation co-efficient, Regression(model) using the regression equation, Summary

8. **Non-parametric tests**: Introduction, sign test, Wilcoxon signed rank test, median test, Mann-Whitney test and rank correlation, summary

9. **Multiple regression and correlation; Logistic regression; ANCOVA**: Introduction, Methods and application

10. **Vital Statistics**: Introduction, death rates and ratios, measures of fertility, measures of morbidity, measures of mortality, indicators of levels of health

**Reference Books:**


3. **Drug therapy of parkinsonism and other degenerative disorders of the brain** - Local anesthetics, Adrenergic and adrenergic blocking drugs. Histamine and anti histamic drugs

4. Pharmacotherapy of cough

5. Pharmacotherapy of bronchial asthma and rhinitis

6. Digitalis and pharmacotherapy of cardiac failure

7. Vasodilator drugs and pharmacotherapy of angina pectoris

8. Pharmacotherapy of hypertension

9. Drugs and blood coagulation

10. Drugs effective in iron deficiency and other related anemias

11. Diuretics

12. Emetics, drug therapy of vomiting, vertigo and diarrhea

13. Pharmacotherapy of constipation

14. Pharmacotherapy of peptic ulcer

15. Sulfonamides, Trimethoprim, cortimoxazole, nitrofurans and quinolones

16. Penicillins and antibiotics effective mainly against gram positive organisms
17. Amonoglycosides and other antibiotics effective mainly against gram negative organisms

18. Antibiotics effective against both gram positive and gram negative organisms

19. General principles of chemotherapy of infections

20. Chemotherapy of urinary tract infections

21. Antiseptics, disinfectants and insecticides

22. Thyroid and antithyroid drugs

23. Insulin and anti diabetic drugs

24. Adrenal cortical steroids

25. Vitamins and antioxidants

26. Drugs, pregnancy and the newborn

Reference Books:

1. Essentials of Medical Pharmacology, Tripathi

2. Basics and Clinical Pharmacology, Katzung
1. Course Overview

Master Over the Mind (MAOM) is an Amrita initiative to implement schemes and organise university-wide programs to enhance health and wellbeing of all faculty, staff, and students (UN SDG -3). This program as part of our efforts for sustainable stress reduction gives an introduction to immediate and long-term benefits and equips every attendee to manage stressful emotions and anxiety facilitating inner peace and harmony.

With a meditation technique offered by Amrita Chancellor and world-renowned humanitarian and spiritual leader, Sri Mata Amritanandamayi Devi (Amma), this course has been planned to be offered to all students of all campuses of AMRITA, starting off with all first years, wherein one hour per week is completely dedicated for guided practical meditation session and one hour on the theory aspects of MAOM. The theory section comprises lecture hours within a structured syllabus and will include invited guest lecture series from eminent personalities from diverse fields of excellence. This course will enhance the understanding of experiential learning based on university’s mission: “Education for Life along with Education for Living”, and is aimed to allow learners to realize and rediscover the infinite potential of one’s true Being and the fulfilment of life’s goals.

2. Course Syllabus

Unit 1 (4 hours)

Unit 2 (4 hours)
Improving work and study performance. Meditation in daily life. Cultivating compassion and good mental health with an attitude of openness and acceptance. Research and Science of Meditation: Significance of practising meditation and perspectives from diverse fields like science, medicine, technology, philosophy, culture, arts, management, sports, economics, healthcare, environment etc. The role of meditation for stress and anxiety reduction in one’s life with insights based on recent cutting-edge technology. The effect of practicing meditation for the wholesome wellbeing of an individual.

Unit 3 (4 hours)
Communications: principles of conscious communication. Relationships and empathy: meditative approach in managing and maintaining better relationships in life during the interactions in the world, role of MAOM in developing compassion, empathy and responsibility, instilling interest, and orientation to humanitarian projects as a key to harness intelligence and compassion in youth. Methodologies to evaluate effective awareness and relaxation gained from meditation. Evaluating the global transformation through meditation by instilling human values which leads to service learning and compassion driven research.

TEXT BOOKS:

REFERENCES:
1. Craig Groeschel, “Winning the War in Your Mind: Change Your Thinking, Change Your Life” Zondervan
3. Evaluation and Grading

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<th>Internal</th>
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<td>Practical (attendance and class participation) 60%</td>
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4. Course Outcomes (CO)

CO1: Relate to the causes of stress in one’s life.
CO2: Experiment with a range of relaxation techniques
CO3: Model a meditative approach to work, study, and life.
CO4: Develop appropriate practice of MA-OM technique that is effective in one’s life
CO5: Inculcate a higher level of awareness and focus.
CO6: Evaluate the impact of a meditation technique

*Programme Outcomes (PO) (As given by NBA and ABET)

PO1: Engineering Knowledge
PO2: Problem Analysis
PO3: Design/Development of Solutions
PO4: Conduct Investigations of complex problems
PO5: Modern tools usage
PO6: Engineer and Society
PO7: Environment and Sustainability
PO8: Ethics
PO9: Individual & Team work
PO10: Communication
PO11: Project management & Finance
PO12: Lifelong learning
CO – PO Affinity Map
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7. **Vitamins**: Historical background, structure, food sources, absorption and transport, metabolism, biochemical function, assessment of status. Interactions with other nutrients. Physiological, pharmacological and therapeutic effects, toxicity and deficiency with respect to the following.
Reference Books:

1. Shils, Olson, Shike and Ross (1999). Modern Nutrition in Health and Disease, 9th edition, Williams & Wilkins
1. Nutrition during different stages of life

Nutrition during Pregnancy: Physiology of pregnancy, nutritional requirements and dietary
guidelines, effect of Nutritional Status on pregnancy outcome, nutrition-related disruptions in
fertility (under and over nutrition), nutrition related complications, complications of
pregnancy, HIV/AIDS during pregnancy – Dietary concerns

Nutrition during lactation: Physiology of Lactation, Human milk composition, Nutritional
requirements & dietary guidelines, Benefits of Breast Feeding, Galactogouges, Lactation
Management in Normal & Special conditions,

Nutrition in infancy: Physiological development, Motor, Cognitive development, Energy and
nutrient needs, feeding in early and late infancy, Common nutrition problems, Feeding Preterm
and low birth weight infants,

Nutrition in Toddlerhood and Preschool, Childhood & Preadolescent: Growth and
development, Nutritional requirements, Nutrition for children with special health care needs,
feeding problems, Nutritional concerns and prevention of nutrition related disorders i. Obesity
– underweight, ii. Deficiency condition, iii. Allergies, eating disorders

Nutrition in adolescence: Growth and development, Physiological and Psychological
changes, Nutritional requirements of adolescents, Health and eating related behavior

Nutrition in Adult and Elderly: Nutrition and work efficiency. Menopausal and post
menopausal women, hormonal changes, nutritional requirement of the adult, Common health
problems in old age, Problems of feeding during old age, Nutritional consideration & Menu
planning for adult and old age

2. Nutrition in special conditions: Nutritional requirements for extreme environments,
Nutritional requirements for space missions
3. Role of Functional foods in Health & Disease

History, Definition, Classification, Sources, Physiological effects - effects on human health and potential applications in risk reduction of diseases of the following:

• Prebiotics
• Probiotics
• Symbiotic
• Non-digestible carbohydrates/oligosaccharides: Dietary fibre, Resistant starch, Gums
• Other Food Components • Polyphenols: Flavonoids, catechins, isoflavones, tannins
• Phytoestrogens and Phytosterols
• Pigments: Lycopene, Curcumin

Reference Books:


1. Molecular Biology and Immunology

DNA replication, DNA Polymerase, Cell cycle, DNA repair.
Transcription, inhibition of transcription, genetic code, post transcriptional pro-cessing, reverse transcriptase.
Protein biosynthesis, post translational processing, inhibitors of protein synthesis.
Molecular genetics and gene expression, principles of breeding, autosomal, recessive, x-linked recessive, population genetics, gene location on chromosomes, mutations, recombination, mutagens, repression, operon, gene amplification, gene switching, transposition of genes, somatic recombination, enhancer, viruses.

Recombinant DNA technology.
Restriction endonuclease, DNA ligase, vectors, chimeric molecules, cloning, gene library, cloning strategies, insitu hybridization, blot techniques and applications, RFLP, Gene Therapy, Transgenesis, DNA finger printing, DNA sequencing, PCR, DNA probes, hybridoma technology.

Pre-natal diagnosis of genetic disorders.
Preparation, assessment and storage of antisera (polyclonal and monoclonal). Methods of assessing analytical sensitivity, specificity and standardization.
2. **Nucleic Acids**
   Chemistry of purines, pyrimidines, nucleosides, nucleotides, nucleic acids, nucleosomes. Structure of DNA and RNA.

3. **Metabolism of Lipids:**
   PUFA, Lipid per oxidation & Eicosanoids-Prostaglandins & Leukotrienes. Lipid and Lipoprotein measurements- blood sampling and storage, Estimation of Lipids-Cholesterol, Triglycerides, Phospholipids & lipoproteins- Colorimetric and enzymatic methods

4. **Inter – relation between the metabolism of Carbohydrate, lipids and proteins**
   Generation of ATP, substrate level phosphorylation & Oxidative phosphorylation
   Brief out line of Electron transport chain
1. Introduction to Course: Lifestyle gene/diet interactions

2. Lifestyle gene/diet interactions; postprandial versus chronic dietary effects; exogenous/endogenous stressors; nature of bidirectional relationships (nutrigenetics/nutrigenomics; host/microbiota

3. Dietary choices in nutrition and nutrigenomics

4. Microbiota: Current knowledge about host/microbiota interactions. Techniques employed

5. Effects of diet on microbiota/host interactions

6. Impact of physical activity on health and disease conditions

7. Sleep and diurnal cycles

8. Food and herbal/supplement interactions

9. Environmental Exposures and chronic diseases

10. Impact of westernized diet across ethnic and racial groups

11. Cultural and culinary practices: (Mediterranean diet, vegetarians, vegans) and evolutionary adaptation

12. Precision nutrition and lifestyle genomics in professional and recreational athletes

13. Lifestyle, nutritional habits and aging-associated neurodegenerative diseases

14. Nutrition, lifestyle, and cancer, Environmental conditions associated with cancer

15. Precision nutrition and lifestyle genomics autism disease spectrum and ADHD

16. Lifestyle, diet associated with heart disease, Genetics, precision nutrition and heart disease

17. Omega-3 deficiencies and inflammatory diseases: Inflammatory Bowel Disease, rheumatoid arthritis, Omega-3 deficiencies and inflammatory diseases: Covid-19 and others
SEMESTER III

24CNF601 Critical Care Nutrition Credits- 4 Total hours:60


3. Enteral Nutrition- Indications and contraindications, Enteral access, Enteral formula composition, Tube feeding delivery systems, Tube feeding administration methods, Complications and monitoring

4. Parenteral Nutrition- 

5. Transitional Feeding
   i. Parenteral to enteral feeding, ii. Parenteral to oral feeding, iii. Enteral to oral feeding, iv. Oral supplements

6. Role of immuno enhancers, conditionally essential nutrients, immune suppressants, and special diets in critical care.

7. Patho-physiological, clinical and metabolic aspects, understanding of the special nutritional requirements, nutritional goals and monitoring the therapy in critical illnesses like - Stress, trauma, sepsis, burns. CV complications and surgery. ESRD, dialysis,
transplant. Multiple organ failure. Cancer, AIDS, GI tract surgery, GER (Gastro-esophageal reflux) and complications, Hepatic failure and transplants, Neurosurgery

8. Complications of Nutritional Support Systems including Refeeding Syndrome


10. Diet related ethical issues in the terminally ill.

Reference Books:

1. Gottschlisch M – “The science and practice of nutrition support”


1. **Public Health Nutrition – An Overview** - Concept and importance of public health nutrition. Public health issues and problems, Health care system in India, Role of public nutritionist in health care delivery

2. **Public Health Problems** - Prevalence and management, Non-Communicable diseases - Obesity, Cardio-vascular diseases, Diabetes, Cancer and their preventive measures, **Nutrient deficiencies** – PEM, severe acute malnutrition, anemia, Vitamin D, Folic acid, IDD


4. **Strategies to combat Public Health Problems** - Improving food and nutrition security - Green White and Blue revolution, Nutrition education - Principles of planning –, where, when, whom, Kitchen garden, food fortification, food enrichment, PDS, PHC

5. **Nutrition Intervention programmes**

   National Nutrition Policy Preschool feeding programme, ICDS, MDM, SNP, WNP, ANP, BNP, NNAPP, FNB, NIDDCP, National Program for Prevention of Blindness due to Vitamin A Deficiency

6. **Strategies to combat malnutrition**


**Economics of Nutrition**: Malnutrition and its economic consequences; Economics in Nutrition – Food security, food production and food pricing
Reference Books:

9. Preventive and Social Medicine, K Park, BansaridasBhanot Publishing House
1. **Introduction to physical activity and exercise** – types, Body system involved in exercise Cardio respiratory, muscular and energy system. Definition of fitness. Substrate utilization during work.


5. **Yoga and Fitness**, effect of yoga on immune system, endocrine system, nervous system, digestive system and muscular system, Health benefits of yoga.

**Reference Books:**


1. **Introduction to nutritional genetics and genomics** - Gene and DNA structure

2. Nutrients and Gene expression with its regulation

3. Nutrients and epigenetics, Genes and disease

4. Molecular methods used in nutritional genomics

5. **Technologies in nutrigenomics**: Genomic techniques: Different sequencing approaches, Microarray, SNP genotyping, PCR and RT-PCR techniques Proteomics Techniques: 1-D, 2-D gel electrophoresis, Differential gel electrophoresis (DIGE), novel peptide identification, peptide sequencing methods

   Metabolic techniques: Chromatography and mass spectrometry techniques, Discovery and validation of biomarkers for important diseases and disorders

6. Nutrigenomics and nutrigenetics in ageing and calorie restriction, obesity, Cardiovascular disease and cancer.

**References Books:**


3. Journal Nutrients 2013, 5, 32-57; Nutrigenetics and Metabolic Disease: Current Status and Implications

4. Journal Nutrigenetics Nutrigenomics 2011; 4:69–89; Nutrigenetics and Nutrigenomics: Viewpoints on the