



**RAMAIAH
UNIVERSITY**
OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences

Programme Structure and Course Details

Of

DM Gastroenterology 2022 onwards

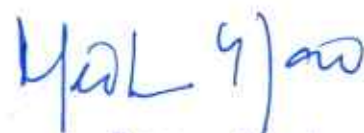

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M.S. Ramaiah University of Applied Sciences
Bangalore - 560 054

M.S. Ramaiah University of Applied Sciences

Ramaiah Medical College



Principal and Dean



Dean - Academics

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**RAMAIAH
UNIVERSITY**
OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences

Programme Specifications

DM Gastroenterology Programme 2022

onwards

Programme Code: MD152

M.S. Ramaiah University of Applied Sciences

Ramaiah Medical College



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M.S. Ramaiah University of Applied Sciences
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University's Vision, Mission and Objectives

The M. S. Ramaiah University of Applied Sciences (MSRUAS) will focus on student-centric professional education and motivates its staff and students to contribute significantly to the growth of technology, science, economy and society through their imaginative, creative and innovative pursuits. Hence, the University has articulated the following vision and objectives.

Vision

MSRUAS aspires to be the premier university of choice in Asia for student centric professional education and services with a strong focus on applied research whilst maintaining the highest academic and ethical standards in a creative and innovative environment

Mission

Our purpose is the creation and dissemination of knowledge. We are committed to creativity, innovation and excellence in our teaching and research. We value integrity, quality and teamwork in all our endeavors. We inspire critical thinking, personal development and a passion for lifelong learning. We serve the technical, scientific and economic needs of our Society.

Objectives

1. To disseminate knowledge and skills through instructions, teaching, training, seminars, workshops and symposia in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to equip students and scholars to meet the needs of industries, business and society
2. To generate knowledge through research in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to meet the challenges that arise in industry, business and society
3. To promote health, human well-being and provide holistic healthcare
4. To provide technical and scientific solutions to real life problems posed by industry, business and society in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences
5. To instill the spirit of entrepreneurship in our youth to help create more career opportunities in the society by incubating and nurturing technology product ideas and supporting technology backed business
6. To identify and nurture leadership skills in students and help in the development of our future leaders to enrich the society we live in
7. To develop partnership with universities, industries, businesses, research establishments, NGOs, international organizations, governmental organizations in India and abroad to enrich the experiences of faculties and students through research and developmental programmes

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Programme Specifications: DM Gastroenterology

Faculty	Ramaiah Medical College
Department	Gastroenterology
Programme	DM Gastroenterology
Programme Code	DM152
Dean of Faculty	Dr Shalini Nooyi
Head of the Department	Dr Avinash Balekuduru

1. Title of the Award: DM Gastroenterology
2. Mode of Study: Full-Time
3. Awarding Institution /Body: M. S. Ramaiah University of Applied Sciences, Bengaluru
4. Joint Award: Not Applicable
5. Teaching Institution: Ramaiah Medical College
6. Date of Programme Specifications: September 2022
7. Date of Programme approval by the academic Council of MSRUAS: 27th September 2022.
8. Programme Approving Regulating Body and Date of Approval: National Medical Council of India
9. Rationale for the Programme

The purpose of PG education is to create specialists who would provide high quality healthcare and advance the cause of science of Gastroenterology is a field of medicine that specializes in the diagnosis and treatment of diseases of the Gastrointestinal tract (GIT). Disorders of the GIT are extremely common and necessitates specialized care including the performance of endoscopic procedures for both diagnosis and therapy. Therefore, training in Gastroenterology requires a concerted effort by specialists in the field to sensitize the students on the fast-changing spectrum of GI disorders and at the same time, provide step-by-step instruction on the performance of endoscopy in a safe and ethical manner. The proposed guidelines provide a reproducible manual for the conduct of a 3-year course in Gastroenterology that can ensure the attainment of specific competencies that meet prevailing expectations of proficiency and professional standards in the global context.



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Programme objectives (PO) for DM Gastroenterology Postgraduate students

- PO1.** Develop the knowledge, skills, and attitude to be a competent Gastroenterologist (C, P).
- PO2.** Demonstrate a commitment to excellence and continuous professional development with integrity, compassion, and sensitivity to patient care. (A)
- PO3.** Acquire the knowledge, skills, and attitude to become an effective teacher and ethical researcher. (A, C, P)
- PO4.** Be able to independently perform endoscopic procedures with a reasonable degree of professionalism and competence. (C, P)

Programme specific outcome (PSO) for DM Gastroenterology

- PSO1** - Demonstrate competence and command a broad knowledge base in the diagnosis and management of common disorders in Gastroenterology and Hepatology. (C, A, P)
- PSO2**- Demonstrate the requisite skills to perform complete diagnostic endoscopic procedures to a reasonable degree of proficiency and ensure quality of care as per prevailing professional standards. (C, P).
- PSO3** - Develop the requisite skills to perform basic therapeutic endoscopy to a reasonable degree of proficiency, all the while ensuring safety and quality of care as per prevailing professional standards. (C, P).
- PSO4**- Practice compassionate patient-centric care to the highest ethical standards of professional practice. (A)
- PSO5** - Foster intellectual curiosity and develop proficiency to perform clinical and translational research in Gastroenterology and hepatology (C)
- PSO6** - Develop competence in various communication domains, audio-visual tools, teaching-learning methods to become an effective teacher in Gastroenterology and hepatology. (C, P)

Note: A- Affective Domain, C- Cognitive Domain & P- Psychomotor Domain

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Course-PO-PSO Mapping

Course Code and name	Program Outcomes				Program Specific Outcomes					
	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
DMC509A Basic Medical Sciences related to Gastroenterology	2	1		2	1		2	3	1	3
DMC510A Clinical Gastroenterology and Pancreatology	3	3	2	3	3	3	3			2
DMC511A Hepatology		3	2		3	3	3			
Research methods, Recent Advances in the field of Liver, Pancreas	2	2	3	2	1		3	2	2	3



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10. Regulations:**(A) Attendance, Progress and Conduct**

1. A candidate pursuing a degree course should work in the concerned department of the institution for the full period as a full-time student. No candidate is permitted to run or work in clinic/laboratory/nursing home while studying a postgraduate course. No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of study.
2. Each term shall be taken as a unit to calculate attendance. Attendance of 80% every term is mandatory for appearing in the final university examination.
3. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each term as prescribed by the department and not absent himself / herself from work without valid reasons.
4. Every candidate is required to attend a minimum of 80% of the training during each academic term of the post graduate course. Provided further, leave of any kind shall not be counted as part of the academic term without prejudice to a minimum of 80% attendance of training period every year.
5. Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

(B) Monitoring of progress of Studies

1. Work diary / Logbook - Every candidate shall maintain a work diary and record of his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. as per the model checklists and logbook specimen copy.
2. A record of all endoscopic procedures performed by the candidate under supervision should be maintained in the Logbook. Annual DOPS evaluation results will also be recorded in the Logbook as per templates provided.
3. Special mention may be made of the presentations by the candidate and details of clinical or planning procedures, if any conducted by them. The work diary shall be scrutinized and certified by the Head of the Department and Head of the Institution and presented in the university practical/clinical examination.
4. Procedure for defaulters: There will be a committee constituted by all teachers to review such situations. The defaulting candidate is counselled by the guide and head of the department. In extreme cases of default, the departmental committee may recommend that defaulting candidate be withheld from appearing in the examination, if she/he fails to fulfil the requirements despite being given adequate chances to set himself or herself right.

11. Teaching Learning Methods:

This being a highly dedicated PG specialty introducing several new concepts/subjects in the course, it is recommended to divide the entire course into two components consisting of First Year of BASIC AND CLINICAL CONCEPTS OF THE SPECIALTY and the next two years of INTENSIVE CLINICAL AND ENDOSCOPIC TRAINING IN THE SPECIALTY.

Teaching programs will revolve around seminars, journal clubs, symposia, reviews, and guest

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lectures which will be prioritized over didactic lectures for acquiring theoretical knowledge. Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations would form the basis of clinical training. Students will also be provided focused hands-on training in performing various endoscopic procedures and dedicated endoscopy review sessions will be held to assess their individual ability to interpret, diagnose and plan interventions.

Exposure to newer specialized diagnostic/therapeutic procedures will be considered for those who demonstrate proficiency with basic endoscopic procedures. Due importance will be given to ward rounds, especially in conjunction with emergency admissions. Supervision of work in the outpatient department should cover the entire range of work in the specialty. It is important to attend sub-specialty clinics. The development of independent skills is an important facet of postgraduate training. Joint meetings with physician colleagues, e.g., radiologists and pathologists, play a valuable part in training.

The training techniques and approach should be based on principles of adult learning. It should provide opportunities initially for practicing skills in controlled or simulated situations. Repetitions would be necessary to become competent or proficient in a particular skill. The more realistic the learning situation, the more effective the learning will be.

Clinical training should include measures for assessing competence in the skills being taught and providing feedback on progress towards a satisfactory standard of performance. Time must be available for academic work and audit. The following is a sample template for the various teaching/learning activities that may be employed:

1. Intradepartmental and interdepartmental clinical case discussion
2. Ward rounds along with emergency admissions.
3. Endoscopy posting to perform diagnostic and basic therapeutic endoscopy as per a structured endoscopy curriculum
4. Conferences, Seminars, Continuing Medical Education (CME) Programmes.
5. Journal Club
6. Research Presentation and review of research work.
7. A postgraduate student would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies to make him eligible to appear at the postgraduate degree examination.
8. Participation in workshops, conferences, and presentation of papers etc.
9. Maintenance of records. Logbooks should be maintained to record the work done, which shall be checked and assessed periodically by the faculty members imparting the training.
10. Postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
11. The Department should encourage e-learning activities.
12. Innovative teaching learning practices
 - a. Endoscopy review meetings – Involves reviewing endoscopies performed in the month, training in video editing and presentation of relevant findings



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- b. Focused discussion during journal club that places the focus on core research aspects like research question, study design and statistical methods.
- c. Mini-seminars- Short (20 min) focused presentation on clinically relevant topics that provide the student with practical perspectives

13. Assessment: It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring will be done by the department staff based on student participation in various teaching/learning activities.

1. Formative assessment during the 4th week of every month to include methods like pedagogy, chart analysis, histopathology report analysis, Viva, standardized patients, MCQs, Open book exams, OSCE will be done. Impact: SWOT analysis can be done, and timely counselling can be done.
2. Theory paper covering Basic Gastroenterology and hepatology at the end of 1st year. FA at the end of second year will be on clinical Gastroenterology and hepatology. Mock SA will be conducted in the same pattern as university exams one month before the final exams.
3. A formal DOPS assessment of endoscopy skills will be done at the end of the second year to assess scope control, independent completion of diagnostic procedures and ability to diagnose common GI conditions. Following the DOPS assessment, basic therapeutic endoscopy can be commenced for students in the third year.
4. Teaching skills: Candidates are encouraged to teach postgraduates of broad specialties, medical students, and paramedical students, if any. In addition, the candidates also take classes on basic anatomy and physiology of the GIT for endoscopy technician's students. Pedagogy as a tool in formative assessment helps the student to be a better teacher.



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Scheme of Examination:**A. Theory (Written Paper) 400 marks**

There shall be four question papers, each of three hours' duration. Each paper shall consist of 10 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers. Details of distribution of topics for each paper will be as follows.

Name of the course	Course Code	Topics	Marks
Basic Medical Sciences related to Gastroenterology.	DMC509A	Applied Anatomy, Pathology, Basic endoscopy technology, General Principles of Gastroenterology and hepatology	100
Clinical Gastroenterology and Pancreatology	DMC510A	Principles and Practice of clinical Gastroenterology	100
Hepatology	DMC511A	Principles and Practice of clinical Hepatology	100
Research methods, Recent Advances in the field of Liver, Pancreas .	DMC512A	Recent Developments in Gastroenterology and hepatology, preventive Gastroenterology, Research methodologies in Gastroenterology	100

A. Clinical:200marks

One long case of 80 and three short cases of 40 each.

B. VivaVoce: 100 marks**1) Viva-Voce Examination:(80Marks)**

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression, and interpretation of data. It includes all components of course contents. In addition, candidates may also be given case reports, charts, gross specimens, pathology slide, Instruments, X-rays, ultrasound, CT scan images for interpretation. In addition, endoscopic images/videos will also be used for assessment.

2) Pedagogy Exercise:(20Marks)

A topic is given to each candidate in the beginning of the clinical examination. He/she is asked to make a presentation on the topic for 8-10 minutes.

C. Total Marks Distribution:

Maximum marks for	Theory	Practical	Viva	Grand Total
M.D degree course	400	200	100	700



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Annexures

Annexure 1_Sample of monthly schedules

Annexure 2_PG outside posting policy

Annexure 3_Logbook entry

Annexure 4_Students appraisal form



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Annexure 1

MONTHWISE TEACHING SCHEDULE FOR POSTGRADUATES DEPARTMENT OF GASTROENTEROLOGY

MONTH	SITE	Teacher
January	Basic Gastroenterology -1	Moderator
February	Basic Gastroenterology - 2	Moderator
March	Basic endoscopy	Moderator
April	Esophagus	Moderator
May	Stomach	Moderator
June	Small Intestine - 1	Moderator
July	Small Intestine - 2	Moderator
August	Large Intestine - 1	Moderator
September	Large Intestine - 2	Moderator
October	Liver and biliary tract - 1	Moderator
November	Liver and biliary tract -2	Moderator
December	Pancreas	Moderator

Note:

1. The respective faculty will oversee the entire process...planning, implementation, and assessment.
2. It is preferable to put the timetable latest by 20th of previous month.
3. PGs are expected to stay connected with the respective teachers well ahead of the class.



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Annexure 2

APRIL TEACHING SCHEDULE FOR POSTGRADUATES THEME: CHRONIC PANCREATITIS

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 Chart rounds	2 Case presentation	3 Grand rounds
4 Sunday	5 Journal club	6 Subject seminar	7 Subject seminar	8 Chart rounds	9 Case presentation	10 Grand rounds
11 Sunday	12 Journal club	13 Holiday	14 Subject seminar	15 Chart rounds	16 Case presentation	17 Grand rounds
18 Sunday	19 Subject seminar	20 Subject seminar	21 Subject seminar	22 Chart rounds	23 Case presentation	24 Grand rounds
25 Sunday	26 Subject seminar	27 Subject seminar	28 Faculty lecture	29 FA	30 Case presentation	

Instructions: -

- All classes will be based on discussion
- The team shall discuss with the teacher at least 3-5 days before the date of the class.



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ANNEXURE – 3
DEPARTMENT OF GASTROENTEROLOGY

POLICY FOR PG POSTINGS

Year wise PG Posting

1. 1st year students are posted in the wards / OPD on rotation basis.
2. 2nd year students are posted for endoscopy/OPD/wards as per a roster maintained in the department
3. During the second-year students will also attend conferences to increase their skill set
4. Final year students will be posted to endoscopy/wards as per a roster.



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Annexure 4Logbook entry

Date	
Setting/method	
Presented/attended	
Summary in brief	
Reflection	
Teachers' comments	

Student's signature

Guide's Signature

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ANNEXURE-5

Postgraduate Students Appraisal Form Name of the PG Student Period of Training Duration:.....to.....

Sl. No	Particulars	Not satisfactory (1,2,3)	Satisfactory (4,5,6)	More than Satisfactory (7,8,9,10)	Remarks
1	Journal based learning				
2	Patient care and rounds				
3.	Bedside teaching, Clinical seminars				
4.	Communication skills				
5.	Logbook				
6.	Thesis work				
7.	CME/Outreach programmes/Conference presentations				
8.	Self-directed learning				
9.	Under-graduate teaching				
10.	Research/Publication				

Sign of the student

Sign of the assessor

Sign of Head of the Department



Handwritten signature: H. L. Rao

Handwritten signature: Shalini

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Course Specifications

DM Gastroenterology

2022 onwards

Course Code: DMC509A



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Course Specifications

Course Title	Basic Medical Sciences related to Gastroenterology
Course Code	DMC509A
Department	Gastroenterology
Faculty	Ramaiah Medical College

Course summary:

This course is designed in such a way that the student will master the basics of Gastroenterology, hepatology, and nutrition.

Course Outcomes:

CO 1: Demonstrate comprehensive knowledge of applied anatomy, classification, histopathology, investigations and staging of diseases of Gastrointestinal tract.

CO 2: Demonstrate the understanding of various concepts of endoscopy and their application in the diagnosis and management of GI disorders.

CO 3: Demonstrate comprehensive knowledge of applied anatomy, classification, histopathology, investigations and staging of hepatobiliary and pancreatic disorders.

Course Content:

1. Biology of the gastrointestinal tract and liver
 - 1) Gastrointestinal Hormones and Neurotransmitters Cellular Communication,
 - 2) Regulation of Gastrointestinal Growth by Hormones and Transmitters,
 - 3) Regulation of Gastrointestinal Hormones by Intraluminal Releasing Factors,
 - 4) Gastrointestinal Peptide That regulates Satiety and Hunger
 - 5) Enteroinsular Axis
 - 6) Mucosal Immunology and Mechanisms of Gastrointestinal Inflammation
 - 7) Cellular Growth and Neoplasia Mechanisms of Normal Cell Homeostasis, Tumor Development
 - 8) Molecular Medicine in Gastroenterology: Current and Future
2. Approaches in GI symptoms and signs
 - 1) Acute Abdominal Pain Anatomic Basis of Pain, Stimulants of Pain, Types of Pain, An Approach to the Patient with Acute Abdominal Pain, Pharmacologic Management of the Acute Abdomen, Chronic Abdominal Pain Definition and Classification of Functional Abdominal Pain Syndrome, Epidemiology and Impact on Health care Systems, Pathophysiology, Clinical features, Diagnosis and Differential Diagnosis Treatment, Symptoms of Esophageal Disease Dysphagia, Odynophagia, Globus Sensation, Hiccups, Chest Pain of Esophageal Origin, Heartburn and Regurgitation, Extraesophageal Symptoms of Gastroesophageal Reflux Disease
 - 2) Dyspepsia Definition, Epidemiology, Cause of Organic dyspepsia, Functional (Non ulcer) Dyspepsia, Approach to Uninvestigated Dyspepsia, Treatment of Functional Dyspepsia



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- 3) Nausea and Vomiting Pathophysiology, Clinical Characteristics of Vomiting, Causes, Diagnostic Evaluation, Complications, Treatment
- 4) Diarrhea Definition, Pathophysiology, Clinical Classification, Differential Diagnosis, Evaluation of the Patient with Diarrhea Treatment, Selected Diarrheal Syndromes
- 5) Intestinal Gas Volume and Composition of Intestinal Gas, Sources of intestinal Gas, Propulsion of Gas Through the Intestinal Tract, Clinical Gas Problems
- 6) Fecal Incontinence Prevalence, Mechanisms of Continence and Fecal Incontinence, Differential Diagnosis Fecal Incontinence, Evaluation of the Patient with fecal Incontinence, Treatment, Management of Specific Situations
- 7) Constipation: Definition and Presenting Symptoms, Epidemiology, Risk Factors, Classification of Constipation, Colonic Anatomy and function, Pathophysiology of Constipation, Disorders of the Anorectum and Pelvic Floor, Constipation with Systemic Disorders, Constipation with Nervous System Disease, Constipation Secondary to Structural Disorders of the Colon, Rectum, Anus, and Pelvic Floor, Medications Associated with Constipation, Psychological Disorders as Causes of or Aggravating Factor in Constipation, Clinical Assessment, Diagnostic Tests, Medical Treatment
- 8) Gastrointestinal Bleeding: Clinical Manifestations, Acute Upper Gastrointestinal Bleeding, Acute Lower Gastrointestinal Bleeding, Occult and Obscure Bleeding
- 9) Jaundice: Determinants of Serum Bilirubin Concentration, Differential Diagnostic of Jaundice, Diagnostic Approach to the Patient with Jaundice, Therapeutic Options
3. Nutrition
 - 1) Nutritional Assessment and Management of the Malnourished Patient Basic Nutritional Concepts, Micronutrients, Starvation, Malnutrition, When Is Aggressive Nutritional Support Indicated for the Hospitalized Patient? Refeeding Syndrome, Management of Severe Malabsorption: A Nutritional Perspective
 - 2) Nutrition in Gastrointestinal Disease Nutritional Assessment, Nutrients, Nutrition in Specific Disease States, Nutrition Therapy
 - 3) Eating Disorders Epidemiology, Etiology and Course, Diagnosis and Evaluation, Gastrointestinal Abnormalities Associated with Eating Disorders, Management of Eating Disorders in the Adult, Medical Management of Gastrointestinal Symptoms of Patient with Eating Disorders
 - 4) Obesity Definition and prevalence Etiology, Gastrointestinal Complications, Non-Gastrointestinal Complications, Treatment
 - 5) Food Allergies Background, Definitions, and Prevalence, Pathogenesis, Clinical Features, Diagnosis, Therapy and Natural History
4. Applied Anatomy and Physiology
 - 1) Applied anatomy of oesophagus, liver, spleen, stomach, small and large intestines, pancreas, and the biliary tree.
 - 2) Lymphatic system and lymphatic drainage pathway of various organs of the GIT
 - 3) Blood supply and neural innervation of the various organs of the GIT
 - 4) Endoscopic anatomy
 - 5) Cross Sectional Anatomy pertaining to US/CT/MR images of the GIT
 - 6) General principles of physiology of the Gastrointestinal tract
 - 7) **Various Investigative and Imaging Procedures** including White light endoscopy, EUS, motility studies and breath tests

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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
Basic Medical Sciences related to Gastroenterology.	CO 1	3			3	1			3	1	3
	CO 2	2			3		2	1	3		3
	CO 3				3					2	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											



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Course Specifications

DM Gastroenterology

2022 onwards

Course Code: DMC510A



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Course Specifications

Course Title	Clinical Gastroenterology & Pancreatology
Course Code	DMC510A
Department	Gastroenterology
Faculty	Ramaiah Medical College

Course summary:

This course is designed in such a way that the student will be able to deliver high quality care to patients with Gastrointestinal disorders

Course Outcomes:

CO 1: Demonstrate comprehensive knowledge of applied anatomy, classification, histopathology, investigations and staging of diseases of esophagus and stomach

CO 2: Demonstrate comprehensive knowledge of applied anatomy, classification, histopathology, investigations and staging of diseases of the intestines.

CO 3: Demonstrate comprehensive knowledge of applied anatomy, classification, histopathology, investigations and staging of diseases of pancreas and biliary tract

Course content:**1. Esophagus**

- 1) Anatomy, Histology, Embryology, and Developmental Anomalies of the Esophagus, Anatomy and Histology, Embryology, Development Anomalies
- 2) Esophageal Motor and Sensory Function and Motor Disorders of the Esophagus Motor and Sensory Innervation, Coordinated Esophageal Motor Activity, Pathogenesis and Categorization of Motor Disorders, Diagnosis, Disorder of the UES and Cervica Esophageal Region, Achalasia, Other Hypermotility Disorders of the Distal Esophagus and LES (Spastic Disorders), Esophageal Hypomotility Disorders
- 3) Gastroesophageal Reflux Diseases and Its Complications Epidemiology, Health Care Impact, Pathogenesis, Clinical Features, Differential Diagnosis, Associated Conditions, Diagnosis, Clinical Course, Complications, Treatment of uncomplicated disease, Treatment of complications
- 4) Esophageal Disorders Caused by Medications, Trauma, and infection Medication-Induced Esophageal Injury, Esophageal Injury from Nasogastric and other Non-endoscopic Tubes, Esophageal Injury from Penetrating or Blunt Trauma, Esophageal Infections in the Immunocompetent Host
- 5) Tumors of the Esophagus Malignant Epithelial Tumors, Other Malignant Epithelial Tumors, Benign Epithelial Tumors, Malignant Nonepithelial Tumors, Benign Nonepithelial Tumors

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2. Stomach and intestine

1. Anatomy, Histology, Embryology, and Developmental Anomalies of the Stomach and Duodenum Anatomy of the Stomach, Anatomy of the Duodenum, Congenital Anomalies of the Stomach and Duodenum
2. Gastric Motor and Sensory Function and Motor Disorders of the Stomach Gastric Motor and Sensory Physiology, Clinical assessment of Gastric Motor and Sensory Function and Dysfunction, Gastric Motor Disorders, Treatment
3. Gastric Secretion Physiology, Quantitative Aspect of Acid Secretion in Humans, Mucus/Bicarbonate Secretion, Secretion of Other Electrolytes (K^+ , Na^+ , Cl^-), Pepsinogens and other Gastric Aspartic proteases, Human Gastric lipase, Intrinsic factor, Gastric Secretion in Disease, Gastric Antisecretory drugs
4. Helicobacter pylori Epidemiology, Virulence Factors, Acute Infection, Chronic Infection, Diagnosis, Treatment, Immunization (Prevention)
5. Gastric and Gastropathies Classification, Chronic, Nonspecific Gastritis, Infection Gastritis, Granulomatous Gastritis, Distinctive Gastritis, Miscellaneous forms of Gastritis, Reactive Gastropathies (Acute Erosive Gastritis), Hyperplastic Gastropathies, Differential Diagnosis of Gastritis and Gastropathy, Treatment and Prevention of Gastritis and Gastropathy
6. Peptic Ulcer Disease Pathophysiology of Peptic Ulceration, Epidemiology, Clinical Features of Uncomplicated Peptic Ulcer Disease, Diagnostic Tests, Complication of Peptic Ulcer Disease, Cameron Ulcers (Linear Gastric Erosions in Hiatal Hernias)
7. Treatment of Peptic Ulcer Disease History, Antisecretory and Acid-Neutralizing Agents, Ulcers Associated with Helicobacter pylori infection, Peptic Ulcer Associated with Nonsteroidal Anti-inflammatory Drugs, Refractory Peptic Ulcers, Stress-Related Mucosal Injury, Treatment of Complications of Peptic Ulcer Disease
8. Tumors of the Stomach Adenocarcinoma, Gastric Lymphoma, Gastric Carcinoid Tumors, Gastrointestinal Stromal Tumors, Miscellaneous Tumors



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
Clinical Gastroenterology and Pancreatology	CO 1	3	3	2	3	1			3		3
	CO 2	2	3	2	3		3	1	3	2	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											



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Course Specifications

DM Gastroenterology

2022 onwards

Course Code: DMC511A

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Course Specifications

Course Title	Hepatology
Course Code	DMC511A
Department	Gastroenterology
Faculty	Ramaiah Medical College

Course Outcomes:

CO 1: Demonstrate comprehensive knowledge of applied anatomy, classification, histopathology, investigations and staging of diseases of Liver

CO 2: Demonstrate comprehensive knowledge of applied anatomy, classification, histopathology, investigations and staging of Biliary tract

Course content:

1. Development of hepatobiliary system
2. Hepatobiliary system: structural, functional, and pathophysiological aspects
3. Liver in health and disease: metabolic, molecular, functional, and structural effects
4. Liver failure
5. Congenital structural defects
6. Metabolic liver diseases
7. Acute liver failure
8. Chronic liver disease
9. Cholestatic liver disease
10. Autoimmune liver disease
11. Drug induced liver injury
12. Acute and Chronic viral hepatitis
13. Liver infections
14. Vascular diseases of liver
15. Non- alcoholic fatty liver disease
16. Hepatobiliary tumors
17. Hepatobiliary disorders in systemic disease
18. Hepatobiliary disorders and other organ- specific manifestations and vice versa
19. Liver and drug metabolism in normal and disease states.
20. Immunological liver diseases
21. Portal hypertension
22. Tropical liver diseases
23. Gut-liver, liver-brain, and liver-heart axis
24. Gall bladder disorders
25. Liver transplantation: medical and surgical aspects
26. Gut and liver in health and disease
27. Biliary tract and pancreas in various disease states
28. Radiological aspects
29. Surgical aspects in hepatobiliary disorders
30. Preventive hepatology



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
Hepatology	CO 1	3	3		3	1			3	1	3
	CO 2	2	3		3		2	1	3		3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											



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Course Specifications

DM Gastroenterology

2022 onwards

Course Code: DMC512A



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Course Specifications

Course Title	Research methods, Recent Advances in the field of Liver, Pancreas
Course Code	DMC512A
Department	Gastroenterology
Faculty	Ramaiah Medical College

Course Outcomes:

CO 1: Demonstrate comprehensive knowledge of recent advances in Gastroenterology, endoscopy and hepatology

CO 2: Demonstrate comprehensive knowledge of various aspects of preventive Gastroenterology and research methodologies in Gastroenterology and hepatology

Course content:**1. Newer Approaches to endoscopic management:**

- 1) Endoscopic diagnostic modalities
- 2) Endoscopic hemostasis
- 3) Endoscopic therapeutic procedures (Dilatation, stenting, polypectomy)
- 4) Endoscopic ablation
- 5) Newer endoscopic modalities – EUS, ERCP, Third space endoscopy
- 6) GI cancer – Endoscopic diagnostic modalities, Endoscopic ablation, Endoscopic palliation
- 7) Quality Assurance in endoscopy
- 8) Non-endoscopic modalities like motility studies, capsule endoscopy and breath tests

2. Preventive Gastroenterology:

- 1) GI Cancer registry and epidemiology
- 2) Prevention and early detection in GI cancer
- 3) GI Cancer education

3. Biomedical Research:

1. Sampling – Random sampling, purposive sampling, advantages of sampling, Various methods of sampling (Simple random, systematic, stratified, cluster, Multistage & multiphase), sampling error, non-sampling error.
2. Descriptive statistics – Arithmetic mean, Median, Mode, and Standard error, coefficient of variation.
3. Graphics presentation of data – Bar diagram, histogram frequency curve, line graph, pie chart.
4. Normal distribution – Definition and properties/Confidence interval, Basic concept of testing of hypothesis, p-value, power of the test.
5. Test of significance –t-test, test of proportion, chi-square test, concept of analysis of variance.



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6. Study design – Descriptive studies, analytical studies. Observational studies, experimental studies, prospective studies, retrospective studies, odds ratio, relative risk, attributable risk percent, population attributable risk percent.
7. Correlation and regression – Simple correlation, linear regression, concept of multiple regression.
8. Survival analysis – Life table, Survival analysis, K – M Method, Cox regression, log rank test.
9. Sample size determination – Basic concept, sample size determination of estimating proportion and mean.
10. Clinical trials in GI research – Basic concept.



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
Research methods, Recent Advances in the field of Liver, Pancreas	CO 1	3		2	3		2		3		3
	CO 2	2		3	3	3		1	3	1	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											



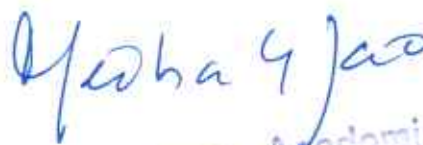
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Course materials:

1. Textbooks

- 1) Gastrointestinal and Liver Disease- Sleisenger & Fordtran
- 2) Diseases of the Liver - Eugene R. Schiff
- 3) Diseases of the Liver & Biliary System- Sheila Sherlock
- 4) Yamada textbook of Gastroenterology-YAMADA
- 5) Sivag's textbook of GI Endoscopy- SIVAG
- 6) Gastro-intestinal Endoscopy- P. Cotton

2. Journals

- 1) Gastroenterology
- 2) Hepatology
- 3) GUT 41 Curriculum DM (Gastroenterology)
- 4) Journal of Hepatology
- 5) American Journal of Gastroenterology
- 6) Gastrointestinal Endoscopy
- 7) Seminars in Liver disease
- 8) Indian Journal of Gastroenterology
- 9) New England Journal of Medicine
- 10) Lancet
- 11) Tropical Gastroenterology

3. Clinics

- 1) Gastroenterology Clinics of North America
- 2) Clinics in Liver disease
- 3) Gastrointestinal Endoscopy Clinics of North America



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