

OST 597: Biomedical Research Structure and Methods

Spring 2025 January 13th 2025-May 16th 2025

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Table of Contents

[Faculty & Staff Information](#)

[Course Director Biosketch\(es\)](#)

[Contributing Faculty](#)

[Curriculum Assistants \(CAs\)](#)

[Who to Contact with Questions](#)

[Course Information](#)

[Course Description & Overview](#)

[Course Objectives](#)

[Textbooks and Resources](#)

[Grading Schema](#)

[Grading Requirements](#)

[Required Component 1](#)

[Required Component 2](#)

[Required Component 3](#)

[Policies & Resources](#)

[Academic Support Resources at MSUCOM](#)

[College or University Policies with Which Enrolled Students Must Be Familiar](#)


[Student Feedback](#)

[Course Schedule and Changes to Schedule or Requirements](#)

[Addendum: Course Schedule](#)

Faculty & Staff Information

Course Director Biosketch

| Contact Information | Biosketch |
|--|---|
|  <p data-bbox="155 1031 461 1205"> Furqan B. Irfan, MBBS (MD), PhD, MBA irfanfur@msu.edu (517) 353-7785 Primary Site: EL Office Hours: Request meeting via email contact. </p> | <p data-bbox="496 594 1078 747"> Dr Furqan B. Irfan has MBBS (MD), PhD, MBA-background, and is an Associate Professor, Department of Neurology, and Director of Research Development, College of Osteopathic Medicine, Michigan State University (MSU COM). He has broad ranging experience in teaching, research, global health and innovation. </p> <p data-bbox="496 770 1078 1052"> At MSU COM, he is the course director and teaches Epidemiology, Biostatistics, and the Evidence-based Medicine course. His research overlaps epidemiology, health systems strengthening and global health policy, chronic diseases (cardiovascular and cancer), one health, zoonotic diseases, data science, and climate change. He has over 2.5 million dollars in active grant funding, and 35 peer-reviewed publications. Besides United States, the current funded projects span three continents: South America (Peru and Brazil), Africa (South Africa and Botswana), and Asia (Laos, Thailand and Vietnam). </p> <p data-bbox="496 1075 1078 1228"> Dr Irfan has served as an Advisory Board member at Health Practice, Silicon Valley Innovation Center, Infineon Technologies AG. Infineon Technologies AG is one of the largest semi-conductors (microelectronics and sensors) manufacturers worldwide with an annual revenue of \$10 (€8.6) billion in 2020. </p> <p data-bbox="496 1251 1078 1455"> Dr Irfan works with governments, multi-lateral donors, non-government organizations (NGOs), and communities in developing countries for health systems strengthening, health policy, universal health coverage, and global health security. He is the Technical Advisor to Manhattan Strategy Group in Washington DC and has served as the technical lead on consortiums for multilateral donor and USAID awards, in the range of \$25-50 million. </p> |

Contributing Faculty

There are over 30 principal investigators that serve as guest lecturers and will present for OST 597, the list changes some each semester. These principal investigators are both from outside and within MSUCOM and their research ranges from translational and lab-based research to clinical research, data science/machine learning, and quality improvement projects. These contributing faculty have agreed to take COM students for research mentorship as Capstone projects after completion of this [course](#).

Commented [PR1]: How do I not link this to the Table? Patty, look into this 😊

Curriculum Assistants (CAs)

| Name | Email | Phone | Location |
|--------------------------------------|------------------|--------------------------|----------|
| Patty Roberts - Curriculum Assistant | robe1204@msu.edu | 517-204-4803 (Cell-Text) | EL |
| Rusti Sidel - Student Coordinator | smithru2@msu.edu | 517-884-3827 | EL |

Who to Contact with Questions

| Question, Need, or Topic | Contact Person |
|------------------------------|--|
| Course - Logistics & Details | Contact CAs for rooms, groups, materials, links, schedule, etc. |
| Course - Overall | Contact Course Directors (in bold above). |
| Course - Specific Content | Contact Contributing Faculty for the content (see schedule). |
| Absences | Contact Course Directors (in bold above). |
| Behavior | Submit exemplary or concerning behavior to the CGPI . |
| Enrollment | Inquire with MSUCOM Registrar . |
| Personal/Wellness Needs | Inquire with Wellness & Counseling . |
| Study Skills or Progression | Inquire with Academic & Career Advising . |
| Technical Support | Inquire with MSU IT Service Desk . Indicate COM affiliation. |

Course Information

Course Description & Overview

Biomedical Research Structure and Methods is a 2-credit elective course offered in the Spring Semester. Over 30 faculty from within and outside MSU give talks on their research

and introduce the students to a wide variety of research types and methods. These faculty are also interested in accommodating COM students in their research projects and mentoring them in research. The students will attend lectures and workshops and participate in large group case discussions. Students that successfully complete this course will be encouraged to undertake a Capstone research project under the rubric of OST 599 Biomedical Research Elective. These students will receive assistance to find a research mentor and carry out a project.

Course Objectives

The goal of this course is for the student to achieve an understanding of research hypotheses, methodology, research ethics, introductory biostatistics, design of research proposals, data collection, and manuscript writing. The course provides the student with exposure to a wide spectrum of research; basic science and molecular research, translational and clinical research, health services research, and epidemiological research. In conjunction with the Capstone Research Project program, the goal is for medical students to understand research principles and methods and apply them by carrying out a research project with a research mentor, ideally resulting in conference presentations and publications.

The primary learning objectives for this course are to understand:

1. How research questions and hypotheses are developed.
2. Basic research methodology and different study designs.
3. Different methods and principles in translational research.
4. Basic biostatistical and epidemiology concepts.

You will meet the objectives listed above through a combination of the following activities:

- Attend all lectures and faculty facilitated workshops via Zoom Webinars.
- Active participation in large-group case discussions via Zoom Webinars.
- Completion and submission of assignment.

Elective Structure

The course will be delivered in a blended format, with Zoom lectures, online reading materials, large group case discussions, and workshops.

This research elective course will be completed during the Spring Semester. The student will be expected to attend classroom lecture and workshop sessions via Zoom.

Teaching and learning approach in this course will include a combination of different methods. Learn before lecture (LBL) will consist of reading material and published articles. Instructors will deliver lectures and facilitate active-learning workshops with practical research case discussions.

This will be an elective, one semester (14 weeks) course. The course content will cover the basic principles and methods of biomedical research and its application to conduct research.

Each lecture will be followed by a large group case discussion via Zoom.

The lecture, large-group case discussion and workshop topics will be the following:

- Translational research
- Biostatistics 1: Statistics for lab. Scientists
- Translational Research case studies
- Clinical Research case studies
- Research Ethics
- Developing a Research Question and Hypothesis
- Literature search and reference management software
- Case-control study
- Conduct a case-control study
- Cross-sectional study
- Conduct a cross-sectional study
- Cohort study
- Conduct a cohort study
- Quality Improvement projects
- Essential components of an abstract, research presentation and manuscript

Course Requirements

- Participation in weekly lectures and large group discussions
- Participation in active-learning workshops via Zoom
- Completion and submission of assignments
- Attendance will be taken weekly via Zoom

Required Exams/Assessments

- None

Textbooks and Resources

Most MSUCOM courses make use of [D2L](#) as a course website to share materials, [Google Calendar](#) to share course schedules, [Zoom](#) to host online meetings, and [iClicker](#) to facilitate audience polling. Visit <https://bit.ly/msucomtech> for reminders on how to access and use these resources. Other course-specific resources include:

| Status | Resource |
|----------|---|
| Optional | D. Celentano M. Szklo (2018). <i>Gordis Epidemiology</i> . Sixth Edition. Philadelphia: Elsevier Saunders. |
| Optional | A. Aschengrau, GR Seage (2018). <i>Essentials of Epidemiology in Public Health</i> . Fourth Edition Jones and Bartlett Learning, MA |
| Optional | Pagano, M. and Gauvreau, K. (2000). <i>Principles of Biostatistics</i> . Second Edition Belmont, CA: Wadsworth. |

Note: These books can be expensive and are only recommended for students who want to get a deeper understanding of Research Methodology, Epidemiology and Biostatistics. The information and learning materials provided in the course are sufficient to achieve the course goals

Grading Requirements

The MSUCOM D.O. degree program incorporates both horizontal and vertical curriculum integration, meaning course activities and assessments require ongoing development and integration of knowledge and skills acquired in previous courses. Required components include:

OST 597 will be graded overall as Pass/Fail. The cutoff percentage for passing the course is 70%.

The table below describes the graded course activities including points and activity description. The first column includes the points possible, and the second column includes a description for each activity.

Course tasks and assignments will be assessed on the basis of:

- Participation in lectures and large group case discussions.
- Completion of the workshop assignments.

| Points | Description |
|--------|--|
| 50% | Participation in the lectures and large group case discussions |
| 50% | Completion of the workshop assignments |
| 100% | Total Points Possible |

Students should submit the assignment on time. Any work submitted late will result in

decreased course grade for the assignment activity.

Students will receive a Certificate of Completion or a Certificate of Participation (for those students who are not able to attend all lectures and workshops (at least 70% attendance required and will be taken via zoom)

Policies & Resources

Academic Support Resources at MSUCOM

Students are encouraged to connect with [Academic and Career Advising](#) (ACA) to access academic, board, and career advising across the 4-year D.O. curriculum. As a way to acclimate to the MSUCOM curriculum, you may access ACA's [On Target](#) website for semester roadmaps, tools needed to be successful in the curriculum, and targeted resources for different learning situations. Each semester's roadmap contains course expectations, tips, potential challenges, notes on longitudinal content and skills integration, and study guides.

College or University Policies with Which Enrolled Students Must Be Familiar

| Policy | Location |
|--|--|
| Common Ground Professionalism Initiative | MSUCOM CGPI Site |
| Computer-Based Testing | Student Handbook - CBT Policy |
| Disability & Reasonable Accommodation | Student Handbook - Diversity and Inclusion |
| iClicker | Student Handbook - Information Technology Resources |
| Medical Students Rights and Responsibilities | Office of Spartan Experiences Site |
| MSUCOM Academic Code of Professional Ethics | Student Handbook - Academic Code of Professional Ethics |
| Osteopathic Clinical Training & Student Safety | Student Handbook - Osteopathic Clinical Training & Student Safety |
| Preclerkship Attendance & Absences | Student Handbook - Attendance & Absences |
| Relationship Violence & Sexual Misconduct & Title IX | Office for Civil Rights & Title IX Education & Compliance Site |
| Religious Observance Policy | Office of the Registrar Site |
| Remediation | Student Handbook - Remediation |

| Policy | Location |
|------------------|----------------------------------|
| Student Handbook | Student Handbook |

Student Feedback

MSUCOM values student feedback, using this to model practice-based learning and improvement and to promote continuous quality improvement of learning experiences.

| Route | Description |
|----------|---|
| Informal | We invite you to respectfully provide constructive suggestions to Course Directors, Contributing Faculty, or Curriculum Assistants at any time. |
| Formal | MSUCOM will deploy brief surveys through Medtrics to gain feedback on the Course, Course Directors and Contributing Faculty. Additionally, MSU sends an optional Student Perceptions of Learning Survey (SPLS) to enrolled students at the conclusion of each course to gain feedback on the course and Course Directors. |

Course Schedule and Changes to Schedule or Requirements

Due to external circumstances (e.g., weather/maintenance closures, clinical obligations, student cohort needs, etc.), course requirements published in the course syllabus and/or course schedule may be subject to change. Timely communication regarding changes will be provided to enrolled students via the course [D2L](#) site, [Google Calendar](#), and/or [MSU email](#). Contact curriculum assistants with questions. Any changes made will be considerate of the [MSU Code of Teaching Responsibility](#) and the [Medical Students Rights and Responsibilities](#).

Addendum: Course Schedule

Updated Last: 10.23.24 PR

| Date | Time | Topic/Title | Faculty | Event Type & Origin [options] | Notes |
|--------------------------------|--------------------------|-------------|---------|---|-------|
| Week #1 1/27/2025 Monday | 5:00pm-8:00pm | | | Zoom | |
| Week #2 2/3/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #3 2/10/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #4 2/17/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #5 2/24/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #6 3/3/2025 Monday | No Class Spring Break | | | | |
| Week #7 3/10/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #8 3/17/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #9 3/24/2025 Monday | 5:00pm-8:00pm | | | | |

| Date | Time | Topic/Title | Faculty | Event Type & Origin [options] | Notes |
|---------------------------------|---------------|-------------|---------|---|-------|
| Week #10 3/31/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #11 4/7/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #12 4/14/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #13 4/21/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #14 4/28/2025 Monday | 5:00pm-8:00pm | | | | |
| Week #15 5/5/2025 Monday | 5:00pm-8:00pm | | | | |
| | | | | | |