DERMATOLOGY

Overview

The Department of Dermatology and Cutaneous Surgery (http://dermatology.med.miami.edu/master-of-science-in-skin-biology/) offers a unique Master of Science in Skin Biology and Dermatological Sciences (MS-SBDS) program. The program prepares students for careers and leadership in skin science and industry. The curriculum covers basic science and laboratory techniques, as well as management skills, grant & regulatory issues, enterprise issues, and clinical problems.

The Master of Science in Skin Biology and Dermatological Sciences program (MS in SBDS) is unique in its depth and breadth because it covers basic science research and laboratory techniques. In addition, the degree considers a variety of additional skills to help you succeed in industry and academia, for it considers management skills, grant writing, regulatory issues, enterprise formation issues, and clinical problems.

Skin biology includes many biological processes: development, perpetual differentiation and barrier maintenance, stem cell biology, tissue repair and regeneration, neogenesis, native and adapted immunity, and genetic disorders just to name a few. The areas represented in our research base include aging, microbiology, inflammation, immunology, genomics, pharmacology, biochemistry, cell and stem cell biology as well as clinical research using areas of a variety of skin disorders, aging, aesthetics, cancer, and wounds as a clinical touchpoint.

Training in all these aspects is currently not provided by any single program in the United States. Thus, a Master's degree in Skin Biology and Dermatological Sciences will impart a unique skill set and research background. There is a growing need for knowledgeable health care professionals. Health care providers, policy makers, research scientists, academic practices in the US and in the rest of the world, as well as makers of skin and skin care products from devices, drugs and cosmeceuticals and their workers need trained personnel. The coursework in this degree program will offer essential scientific knowledge, management, and administrative skills that will be helpful for individuals desiring a skin sciences oriented career.

Program Options

Master of Science (MSc.) in Skin Biology and Dermatological Sciences (MS in SBDS), offers a Thesis path and Non-Thesis path.

- Thesis Path: The MSc. with thesis path requires completion of a laboratory research project and thesis. This option is tailored for students interested in doing research or contemplating work for a Ph.D. degree or academic career.
- Non-Thesis Path: The MSc. without thesis option is designed for students who wish to improve their knowledge in Skin Biology and related sciences through a rigorous series of courses. The program may fit for people from industries or organizations.

Both thesis and non-thesis options are also helpful for students seeking to apply to medical school or a dermatology residency program.

Contact

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MS in Skin Biology and Dermatological Sciences

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M.S. in Skin Biology and Dermatological Sciences (http://bulletin.miami.edu/graduate-academic-programs/medicine/dermatology/skin-biology-and-dermatological-sciences-ms/)

M.S. in Skin Biology and Dermatological Sciences (Online) (http://bulletin.miami.edu/graduate-academic-programs/medicine/dermatology/skin-biology-and-dermatological-sciences-online-ms/)

DER 600. Cutaneous Biochemistry, Cell Biology and Genetics. 3 Credit Hours.
This course is designed to provide students with a fundamental understanding of the genes, structure and functions of human skin. The course will bring students to integrated sciences of human skin, relating to its three core subjects, in biochemistry, cellular and molecular biology, and genetics. The course will encompass comprehensive discussions of related topics, such as, cellular and molecular structure of the skin, genes and gene regulation, biochemical reactions, metabolism, and genetic processes that transmit biological information and regulation.
Components: LEC.
Grading: GRD.
Typically Offered: Fall & Summer.

DER 601. Introduction to Dermatology. 1 Credit Hour.
The aim of the course is to familiarize participants with the basic subject of dermatology and the most common terminology. Students will be introduced to the subject of dermatology, subspecialties in dermatology, structure of the skin (basic anatomy and physiology), terminology (primary and secondary cutaneous lesions), and examples of the most common dermatological conditions.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

DER 603. Skin Biology and Pathophysiology. 3 Credit Hours.
This course helps students to understand the fundamental concepts on and connection between structure and function of the skin. The course will include biology of major skin cell types of keratinocytes, fibroblasts, endothelial cells, melanocytes and Langerhans cells. It will cover biology of skin metabolism, skin appendages, skin matrix, cutaneous vasculature, neuroendocrine system and major processes required for cutaneous barrier function during normal and pathophysiological states. Molecular and cellular mechanisms of cutaneous wound healing, matrix remodeling, tissue regeneration and skin ageing will be also included into coursework.
Prerequisite: DER600 (to request waiver, contact the Program Director).
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

DER 605. Microbiology and Immunology of the Skin. 3 Credit Hours.
This course covers skin microbiota and immune components of the skin in healthy and disordered states. The microbiology will cover bacterial species that cause most common skin infections such as Staphylococcus aureus (folliculitis, impetigo, abscesses, pyoderma, toxic-shock syndrome, staphylococcal scalded skin syndrome, wound infections); Streptococcus pyogenes (impetigo, erysipelas, cellulitis, necrotizing fasciitis, rheumatic fever, scarlet fever, wound infections), and Corynebacterium spp. (wound infections), etc. The bacterial biofilms and their importance in skin infections will also be addressed. The skin hosts the same immunocompetent cell types found throughout the body -T cells, B cells, macrophages, eosinophils, neutrophils, etc. -as well as its own skin-specific subpopulations-Langerhans cells, keratinocytes, and dermal dendrocytes. The second part of the course will cover the biology of immunology of the skin in normal functioning and underlying both intradermal allergic reactions and skin-specific autoimmune disorders (alopecia areata, vitiligo, psoriasis), as well as the standard treatments for each. Further, this course addresses unique immune environments within the skin, such as the immune privilege of the hair follicle, and wound infection.
Pre-Requisite DER 600 (to request a waiver, contact the Program Director).
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

DER 606. Dermato-epidemiology. 2 Credit Hours.
Students will be introduced to the emerging discipline in skin epidemiology or Dermatoepidemiology, to obtain an overview of incidence rates and time trends of skin disorders in the US and in the world, learn biostatistical tools in data analysis including descriptive statistics, hypothesis testing, analysis of variance, and regression analysis. Students gain an appreciation for disparity in the disease outcomes among populations and various barriers contributing to current disparity. Students will also learn about various state and national registries for skin cancer and some other skin disorders available for database research.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

DER 607. Dermatopharmacology. 2 Credit Hours.
This course familiarizes students with the mechanisms of drug action, FDA-indications, off-label uses, safety and efficacy, side effects and necessary monitoring and important drug interactions relevant to topical and systemic medications used in dermatology. The course covers skin barrier and transdermal drug delivery (structure of the skin barrier, factors affecting the skin barrier, strategies to enhance transdermal drug delivery), major drugs used in dermatology including glucocorticosteroids, retinoids, antimicrobials, immunomodulators, agents used in oncology, hormonal therapy, other systemic medications (antimalarials, colchicine, dapsone, leukotriene inhibitors, antihistamines, thalidomide) and topic medications.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

DER 608. Photobiology and Photomedicine. 1 Credit Hour.
This course discusses fundamental concepts on photobiology and phototherapy with Ultraviolet light (UV) B, Excimer Laser, UV A, PUV A (psoralen + UV A), Photopheresis, and Photodynamic therapy. The course will cover photobiology, photochemistry and mechanisms of actions. Treatment protocols with clearing phase and maintenance phase, indications, adverse effects and complications, practice and techniques and future directions will be also included into coursework.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

DER 609. Skin Carcinogenesis. 2 Credit Hours.
This course considers the etiology, pathophysiology, epidemiology, types, prognosis and various treatment of the most common types of skin cancers will be covered. Skin cancer is by far the most common type of cancer affecting the humans. More than 50% of all the cancers combined are skin cancers. The most common skin cancer is Basal Cell Carcinoma (BCC). The second most common type is Squamous Cell Carcinoma. One of the most serious form of skin cancer is Melanoma. There are other types of skin cancers that affect us. One in 5 Americans develop skin cancer during their lifetime.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

DER 610. Clinical Skin Diseases. 2 Credit Hours.
This course gives students a clinical overview of the common skin disorders encountered by society. It discusses the most common skin diseases such as acne, seborrheic dermatitis, and xerosis, with an emphasis on pathogenesis, and current research in these conditions. Older treatments will be compared to newer treatments with respect to efficacy as well as cost to patients.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

DER 611. Visualizing the Skin. 2 Credit Hours.
This course covers basic and advanced techniques of visual examination and digital photography of the skin and hair. Topics include macrophotography of the skin and scalp, dermatoscopy, processing of biopsies for histology, routine and special histological staining, microscopy with regular and special lights, immunohistochemistry and immunofluorescence, and recent advances of non-invasive methods of visualizing the skin in depth such as optical coherence tomography and in vivo confocal microscopy.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

DER 612. Grant Writing. 1 Credit Hour.
The course presents approaches and important aspects of preparation of some major grant applications to including government funding from National Institute of Health (NIH) such as Research grants (R formats) for academia and Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grants for industries and grants from Department of Defense. Major sources, tools and policies for grant application and management will be discussed.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

DER 613. Techniques in Skin Research. 1 Credit Hour.
This course will cover different areas of research techniques employed in studying skin biology/ pathophysiology that span from in vitro cell based assays, ex vivo skin or reconstructed skin equivalents to in vivo animal models to study skin biology and skin diseases, and will integrate various molecular, cellular and tissue based methods. The course will balance multiple teaching methods from traditional didactics to individual and group “hands-on” laboratory experience and training. Its main approach will be using skin specimen (human or animal) as a major source and starting point. It will follow progression from simple methods (cell-based) to more complex (organotypic and tissue-based techniques) to in vivo animal models in pre-clinical trials. The course will also cover high throughput approaches in skin genomics, genetics and proteomics, and use and analysis of big data as well.
Prerequisite: DER 603.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

DER 614. Innovation in Dermatology. 1 Credit Hour.
The aim of this course is to familiarize the participants with the tools of innovation. It will cover the strategic processes of how to ideate, formulate, innovate and push through new ideas-from concept to implementation. This course will also cover the issues related to patent and how to protect the intellectual property.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

DER 615. Dermatology Health Care Delivery. 1 Credit Hour.
This course prepares students for positions of leadership in skin care and skin health-related industrials and organizations. The course focuses on the educational needs of professionals already fully employed in the health care industry, as well as those aspiring to careers in the field. The course considers practical administrative skills as well as broad strategic and theoretical perspectives to students who wish to expand their knowledge of management and administration as applied to the skin care industry, with emphasizes in the development of business; technical, administrative, and leadership concepts as they apply to the clinical practice and skin care industry. TeleHealth, TeleDermatology and Clinical Outreach will also be discussed. This course considers the topics on the development of business, technical, administrative, and leadership concepts as they apply to the health care industry. Students will consider issues pertaining to animal use and protection and human subject in research, regulatory requirements and allied issues.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

DER 622. Introduction to Dermatopathology. 1 Credit Hour.
This course is the continuation of the course DER 603 Skin Biology and Pathophysiology. The aim of the course is to give students a general introduction to clinical histopathology in common skin disorders. The course will familiarize students with basic terms of histopathological changes in skin tissue, basic characteristic pattern recognitions, clinic-pathologic correlations, and histopathologic features of common skin diseases.
Prerequisite: DER 603.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

DER 623. Techniques in Skin Research- II. 1 Credit Hour.
This course is the continuation of the course DER 613 Techniques in Skin Research-I. It will teach students how to approach and solve research problems with different strategies and methods. Various research models specific to skin research will be discussed including angiogenesis, aging, cancer, endocrinology, hair, itching and sensation, wound repair and tissue regeneration, therapeutic research in drug transdermal and systemic deliveries, and clinical skin disease research and therapeutic trials as well. Students will also consider issues pertaining to animal use and protection and human subject in research and allied issues.
Prerequisite: DER 613.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

DER 631. Advances in Dermatology. 1 Credit Hour.
This hour-long seminar course is held in conjunction with Dermatology Grand Rounds, which will be the basis of this course. The purpose is to help students to keep up with advances in investigative dermatological research and patient care. The lectures are delivered by Dermatology full time faculty, voluntary faculty, visiting dermatologists/investigators, and physicians and investigators from related disciplines at the University of Miami. This series covers various aspects of skin biology, dermatology, and related disciplines.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

DER 632. Advances in Dermatology. 1 Credit Hour.
This hour-long seminar course is held in conjunction with Dermatology Grand Rounds, which will be the basis of this course. The purpose is to help students to keep up to date in advances in investigative dermatological research and patient care. The lectures are delivered by Dermatology full time faculty, voluntary faculty, visiting dermatologists/investigators, and physicians and investigators from related disciplines at the University of Miami. This series covers various aspects of skin biology, dermatology, and related disciplines.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

DER 633. Advances in Dermatology. 1 Credit Hour.
This hour-long seminar course is held in conjunction with Dermatology Grand Rounds, which will be the basis of this course. The purpose is to help students to keep up to date in advances in investigative dermatological research and patient care. The lectures are delivered by Dermatology full time faculty, voluntary faculty, visiting dermatologists/investigators, and physicians and investigators from related disciplines at the University of Miami. This series covers various aspects of skin biology, dermatology, and related disciplines.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

DER 641. Frontiers in Sciences. 1 Credit Hour.
This course will be in conjunction with Dermatology Journal Clubs. Students will participate in the presentation, discussion and critiques of the publications in peer-reviewed journals in both basic sciences and clinical aspects, not limited to the field of dermatology, with emphasis in translational research and research applications. In addition, this course will be run in conjunction with Dermatology Research Conferences. It will provide the most recent updates on various aspects of 'dermatological sciences ranging from molecular mechanisms of normal skin regeneration and repair to pathologies such as impaired healing disorders and skin cancer. Faculty, fellows and students from each research laboratory will present their research discoveries. Each MS thesis track student will be required to present their own research projects during their thesis period.
Components: LEC.
Grading: GRD.
Typically Offered: Fall.

DER 642. Frontiers in Sciences. 1 Credit Hour.
This course will be in conjunction with Dermatology Journal Clubs. Students will participate in the presentation, discussion and critiques of the publications in peer-reviewed journals in both basic sciences and clinical aspects, not limited to the field of dermatology, with emphasis in translational research and research applications. In addition, this course will be run in conjunction with Dermatology Research Conferences. It will provide the most recent updates on various aspects of dermatological sciences ranging from molecular mechanisms of normal skin regeneration and repair to pathologies such as impaired healing disorders and skin cancer. Faculty, fellows and students from each research laboratory will present their research discoveries. Each MS thesis track student will be required to present their own research projects during their thesis period.
Components: LEC.
Grading: GRD.
Typically Offered: Spring.

DER 643. Frontiers in Sciences. 1 Credit Hour.
This course will be in conjunction with Dermatology Journal Clubs. Students will participate in the presentation, discussion and critiques of the publications in peer-reviewed journals in both basic sciences and clinical aspects, not limited to the field of dermatology, with emphasis in translational research and research applications. In addition, this course will be run in conjunction with Dermatology Research Conferences. It will provide the most recent updates on various aspects of dermatological sciences ranging from molecular mechanisms of normal skin regeneration and repair to pathologies such as impaired healing disorders and skin cancer. Faculty, fellows, and students from each research laboratory will present their research discoveries. Each MS thesis track student will be required to present their own research projects during their thesis period.
Components: LEC.
Grading: GRD.
Typically Offered: Summer.

DER 661. Research Rotation. 1 Credit Hour.
This elective course will be offered in all three semesters in the first year. Thesis Path students will elect to take this course during the first year. Students will rotate through 1-3 research labs to explore a variety of potential research topics. Thesis path students are required to take at least 1 lab rotation (1 credit) by the end of the 3rd semester. Non-thesis path students will have the option to take this elective course as an opportunity to get hands-on experience in laboratory research and learn research techniques.
Components: LAB.
Grading: GRD.
Typically Offered: Fall.

DER 662. Research Rotation. 1 Credit Hour.
This elective course will be offered in all three semesters in the first year. Thesis Path students will elect to take this course during the first year. Students will rotate through 1-3 research labs to explore a variety of potential research topics. Thesis path students are required to take at least 1 lab rotation (1 credit) by the end of the 3rd semester. Non-thesis path students will have the option to take this elective course as an opportunity to get hands-on experience in laboratory research and learn research techniques.
Components: LAB.
Grading: GRD.
Typically Offered: Spring.

DER 663. Research Rotation. 1 Credit Hour.
This elective course will be offered in all three semesters in the first year. Thesis Path students will elect to take this course during the first year. Students will rotate through 1-3 research labs to explore a variety of potential research topics. Thesis path students are required to take at least 1 lab rotation (1 credit) by the end of the 3rd semester. Non-thesis path students will have the option to take this elective course as an opportunity to get hands-on experience in laboratory research and learn research techniques.
Components: LAB.
Grading: GRD.
Typically Offered: Summer.

DER 670. Dermatology Clinical Shadowing. 1-3 Credit Hours.
This course will consist of shadowing with a clinical faculty dermatologist in clinics in the Department of Dermatology and Cutaneous Surgery at the University of Miami (minimum 2-3 hours per week for each credit hour). This course is for students who are interested in clinical dermatology or medicine. It will give students firsthand experience in clinical dermatology. Students will be rigorously monitored for progress by clinical faculty mentors. Student will be required to write a case report or present a case report at the end of the semester.
Prerequisite: DER 601.
Components: CLN.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.

DER 808. Research Thesis. 1-6 Credit Hours.
Students on Research Thesis track are required to complete 6 research thesis credits. Students are required to conduct thesis research on campus in person in the research laboratories with faculty mentors in the Department of Dermatology and Cutaneous Surgery. Students should discuss with their thesis mentor their research topic, thesis committee, and expectations. A thesis requires an oral defense and a written paper evaluated and approved by the thesis committee convened for that purpose. The student should distribute the written thesis paper to the thesis committee for preliminary approval at least 10 days prior to the oral defense. The oral defense is open to the university community and the public. The written paper should be of quality for peer-review publication as a first author or a co-author. The length of the Research Thesis track is usually 26 months, which includes the required 33-credit lecture courses in the first 14 months, and a dedicated year of thesis research including the oral defense and written thesis paper.
Components: THE.
Grading: GRD.
Typically Offered: Fall, Spring, & Summer.