

Architecture

<u>Code</u>	<u>Name</u>	<u>Course Description and strengths</u>
ARC 115	Design Sketch	Varying approaches to freehand drawing are offered to enhance awareness of the world and gain visual confidence. The course includes exercises in still life, figure drawing, and perspective sketching to expose the students to various ways of seeing. Students learn to draw form, objects, and objects in space. The course explores positive and negative space, edges and contours, and the effects of light and shadow. Proportion, details observation, awareness of space and surrounding, creative problem solving will also be exercised. Media used includes: pencil, pen and ink, charcoal, crayon, pastels and colored pencil.
ARC 116	Design Drawing	This course introduces the use of drafting tools, measurement and scale, and typography and lettering. The skills and knowledge include projection drawings: plan, elevation, section, oblique, axonometric, isometric, external view of one and two point perspectives, internal view of one and two point perspectives, and shade and shadow construction of orthographical projected drawing and perspectives. Above drawings projection can be used for research, analysis and representation.
ARC 117	Design Fundamentals I	This course introduces the practical relevance of a set of nine design principles – Proportion, Asymmetry; Figure & Ground; Transformation; Chance; Dot/Line/Plane; Module; Idea/Concept/ Reflexivity – through structured day-length exercises in combinations of drawing, two-dimensions and three-dimensions. This class emphasizes on skills development, conceptual understanding and good working practice. The assessment is done via brief presentations and teacher advice.
ARC 118	Design Fundamentals II	This course introduces visual thinking methodology: Idea/s – Development – Concept – Outcome/Evaluation, via speculative visual thinking practical assignments involving variable combinations of two dimensions and three dimensions. This class emphasizes on ideas generation, creative thinking, critical evaluation, skills transference, and development across a range of situations. Assignment work is a discussion and evaluation via presentations and critical forum.
ARC 123	History of Art and Design	This course introduces art historical chronology from early civilizations through to contemporary period in relation to theoretical relevance of nine key principles of design; Proportion; Asymmetry; Figure & Ground; Transformation; Chance; Dot/Line/Plane; Module; Idea/Concept/ Reflexivity. Material impartes through combination of lectures, documentary films and illustrated presentations. The written assignments should illustrate combination of researched art history and individual observation of design principles in relation to local environment.
ARC 125	History of Architecture and Interior Architecture I	Overall historical development of architecture and Interior architecture in Western European includes development of designed space, furniture and decoration, form, structure and site planning. This course introduces to Prehistoric period & Ancient Worlds. Classical Foundation: Greek and Roman Architecture. Medieval era: Byzantine, Romanesque and Gothic. Renaissance: Return to Antiquity. Baroque: Mid 17th-18th Century Europe. Neoclassicism Romanticism & Picturesque. The Transition to Industrial Age. Pioneering architecture of Early 20th Century. Towards Demise of Modernism: architecture in Post-war period. Contemporary architecture: The end of the 20th century.

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ARC 226	History of Architecture and Interior Architecture II	This course introduces to a relationship between architecture and interior architecture, and ideology in South - East - and Southeast Asia, ranging from prehistoric to pre-colonisation period. To study two most influential cultures: India and China. Korea and Japan. Mon and Pagan. Srivijaya Kingdom. Ancient Khmer. Lao and Siam. Focus of analysis is on pattern of interior space, furniture and decoration, form and structure, and site planning. Evolution of Buddhist stupas in Southeast Asia that cohere with variation of Thai traditional religious architecture.
ARC 231	Theory of Architecture and Interior Architecture	Architectural Theory can be a method, an explanation, a poetic suggestion, an elucidation; it might provide the answers to definable problems, or make connections which enrich the understanding of the background from which architecture draws. A comparative study of Architectural theories and discourses along with their implementations from classic to contemporary architecture. Topics include scale and proportion, form and space, perspective, spatial perception, space and time, avant-garde, and utopia.
ARC 241	Architectural Design I	This course introduces students to the understanding of architectural design and its basic relationship between space and materialization/fabrication. Students practice their understanding to create and explore spatial configurations and develop design strategies and application methods into particularities of context and specific needs of users. Various media are applied to negotiate between the collective project and the interests of individuals, building on living structures. Various issues relevant to the projects are incorporated into studio lecture.
ARC 242	Architectural Design II	Continuation of ARC 241 with greater level of complexity/sensitivity and focus on specific conditions and the development of working procedures which represent students ideas in regard of internal and external factors, such as socio cultural aspects, human and activities, space and form, site and context. Students learn methods of design thinking and communicating, and integrate knowledge of building materials, structure in the design process and respond to environmental conditions and site planning. Various issues relevant to the projects are incorporated into studio lecture. Introduction to Computer application in the design process and its representation is covered in an intensive one-week seminar before semester begin.
ARC 251	Site Planning and Space Planning	Definition of Site Planning and its application in the architecture. Definition of Urban planning and Landscape Architecture. Fundamental knowledge of Site Planning. Gathering site factors. Conducting process of site planning. Linking knowledge of architecture, civil engineering, landscape architecture, and city planning. Analyzing of various physical & natural aspects of site such as climate, landform and topography. Determining slope analysis. Assisting the formation of proper architectural program. Linking the design of architecture and interior space to outdoor atmosphere at basic level. Integrating definitions of landscape architecture and methodology to understand open space atmosphere. Basic knowledge of plant materials and their physical aspects for designing landscape architecture.

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ARC 261	Building Materials and Construction Technology I	This course introduces the principal construction materials such as wood and masonry regarding their properties:-physical characteristics, qualifications and proper applications for building construction. Wood substituted materials will also be introducing in the course. The course focuses on the principles of construction for wood and masonry for small to medium-scale buildings. All building components; foundations, column, floor, wall, stairs, and roof; will be covered through lectures, drafting project, and field trip. The basic skill and technical drawing techniques, conventional symbols of the materials and also cover to fulfill professional skill for students.
ARC 262	Building Materials and Construction Technology II	Introduction of principal construction materials such as concrete and steel regarding their properties: physical characteristics, qualifications and proper applications for building construction. Basic application of construction materials focuses on materials commonly used for non-structural, building envelope and insulations regarding their properties: physical characteristics, qualifications and proper applications for building construction will be covered through lectures, and field trip. Small scale construction technique and building accessories will also be introduced in the course. The course also focuses on basic building system and appropriate use in different scale building. Students will learn and practice the basic skill of construction drawing of reinforced concrete construction and basic detailing. The skills and technical drawing techniques will be conducted in building components as followings; foundation, column, floor, wall, door & window, stairs, roof, as well as related building systems such as electrical and sanitary works.
ARC 271	Structural Design I	An introductory study of the property of non-metallic and metallic materials such as stone, glass, fiberglass, plastic, timber and cellular: iron, steel, and also composite materials. Examples are drawn from architecture and industrial products. This course discusses: properties of the materials that results in their strengths: behaviors of the materials under forces such as elasticity and stiffness, deformation, cracks and dislocation, buckling of structural members: responses of the materials to their environments that are temperature and moisture. Another main focus is on basic properties, mechanical properties, and behavior of structural materials; wood, masonry, concrete, and steel. Basic structural analysis implemented in architecture is also discussed in the course.
ARC 272	Structural Design II	The emphasis of this course is on engineering qualities of building components that are foundation, column, floor, wall, and roof. Each component is considered according to nature of materials from which they were made. Students learn: a variety of construction methods by which the building components can be built: construction detailing: appraisals of the components in terms of engineering, functional performance, aesthetic: constructions. It discusses: advantages and disadvantages of the building components that are built from different materials. Examples are drawn from either existing buildings or students' design projects.
ARC 281	Environmental Technology I: Comfort Factors and Thermal Design	Concept of Carbon footprint and importance of sustainable design are introduced. The main focus is on Comfort Factors and Thermal Control. Psychometric Chart is used as a tool. Heat Gain Factors include internal and external, as well as solar geometry, sun-earth relationship and solar impact on buildings. Concepts of Passive and Active design include orientation and site design fundamentals, zoning and layout strategies, effects from landscape and surroundings, shading design and effect of natural ventilation. Thermal performances of building component are introduced such as Heat Transfer modes, K, U value, SC, SHGC, OTTV and RTTV.

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ARC 343	Architectural Design III	Development of architectural projects emphasizing on multi-storey residential building as well as medium scale public building. Students learn how to develop a comprehensive architectural project, starting from a design concept to site planning, organization of floor plan and circulation, articulation of façade, selection of materials and construction details. Various issues relevant to the projects are incorporated into studio lecture i.e. the use of precedence study, geometrical assemblage, structure, user behavior, human scale, social and cultural context, building system, building codes and site analysis. Computer skills and 3D modeling workshop is incorporated.
ARC 344	Architectural Design IV	Continuation of ARC343 with greater level of complexity/sensitivity of programmatic and site criteria. Students learn how to develop the design for various building types that requires technical and/or operational specifications. Students learn how to develop a design concept from a specific set of information, unfold it into a comprehensive design that could be implemented; how to justify the design concept by site planning, organization of program and circulation, appearance of building, application of structure, building systems, material selection as well as construction details; how to assess the impact that the design could have on the users and environments. Various issues relevant to the projects are incorporated into studio lecture. This course requires Computer-Aided-Design skills, both 2D and 3D, for design process as well as for presentation.
ARC 352	Urban Planning	Explaining various definitions and aspects of urbanism or city and planning. Theories and ideas about urban planning profession. Theories and ideas about urban design profession. Formations of European and North American cities. Analyzing historical and cultural contexts of cities in Thailand. Comparing Thai metropolises with those in western sphere. Practice of creating and implementing city planning and policies such as land use planning transportation planning, and open space planning. Management of urban facilities and utilities such as drainage system, waste water treatment, street lighting, road, and public transportation. Introduction to community development and participation process in planning. With reference to case studies of Urban Planning.
ARC 356	Landscape Architecture II	This course emphasizes on the profession of Landscape Architecture and its role within Urban Planning: Knowledge of site planning and landscape architecture that involve in more complicated factors of human behavioral, social, cultural, and urban contexts. The complexity of site engineering, site drainage system, ecological system, local community. Vehicular and pedestrian circulation. Designating different structures by selecting and analyzing a site, forming a land use plan. Theory and history of landscape architecture. Aspects of park system and urban space atmosphere are the crucial topics for creating the design that unify architecture, human and all aspects of nature together seamlessly. Readjusting the existing landform design grading, providing proper drainage. Developing the construction details connecting structure and landform
ARC 363	Building Materials and Construction Technology III	Advanced construction technology, material focuses on non-structural, building envelope, and large scale building safety are focus of the course. Design principle concern seismic resistant will be covered in order to equip students with the basic knowledge for minimized danger to building users and building damage. Students will learn and practice the basic skills of construction drawing of steel structure and basic detailing with the introduction of 3D construction methods in the current construction process, i.e. REVIT, BIM, etc.

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ARC 373	Structural Design III	The emphasis of this course is on engineering qualities of building components are considered according to nature of materials from which they were made. Students learn: a variety of construction methods by which the building components can be built: construction detailing: appraisals of the components in terms of engineering, functional performance, aesthetics: constructions and details design. This course includes building components built for large scale and high-rise buildings. It discusses: advantages and disadvantage of the building components: preparation for fighting fire hazard. Examples are drawn from either existing buildings or students' design projects
ARC 382	Environmental Technology II: Architectural Lighting and Acoustics	This course introduces students to the basic physical principles, design implications and performance of environmental design focusing on the behavior of light and sound within and around buildings. Study covers relevant aspects of artificial light, daylight and acoustics that affect the psychological and physiological experience of buildings, performance metrics, and design strategies to equip students with the ability to design and modify the building fabric to enhance the environmental performance of designed spaces. The lighting study also includes lighting systems; lighting efficiency; lighting for a variety of building types; different constraints of lighting concerning atmosphere and visibility. Energy management for lighting in buildings with reference to user's requirements, electrical circuit, equipment and health and safety issue. The second part of course studies acoustics and architecture. It includes a study of nature of sound, sound quality and the influence of sound on architectural design: Noise control and protection for interior space and open-air environment, Propagation of sound, noise reflection and absorption, applications of the knowledge on architectural design.
ARC 383	Environmental Technology III: Building Service Systems	The main focus is on building service systems: fundamentals of building sanitation, building plumbing, building illumination, fundamental of electrical systems in building, circulation, communication, air-conditioning system: principles, types, components, efficiency, and energy consumption, ventilation control, health and safety issues, intelligent building systems. It also explores different methods of assembling and detailing in the integration of such systems. Along with a look at the various system types and equipment, the class also emphasizes energy usage and savings for buildings.

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ARC 445	Architectural Design V	Advanced studios are based on students individual interest on exploring diverse design directions from small scale up to a large scale projects with great complexity and integration of various factors related to architectural design, such as: Design Process and Tectonic formation, Material Constructions and Structural Design, Environmental Technology, Energy-efficiency and Conservation, Digital Media and Technology, History & Theory, Regional and global Social, Culture & Urban Community as well as Social Humanities. Students have to show a high level of understanding in the process of integrating technology with architectural design. Essential figures have to be shown using computer aided software together with hand calculation where necessary. Students are required to take care of different realms they experienced in previous design studios: design fundamentals, functions and construction, and architectural concepts. Computer becomes a natural tool involving in every design process. High level of communication skills is expected to present the transformation from a virtual realm into a physical reality. Various issues relevant to the projects are incorporated into studio lecture. Each student can select his/her own interest project from the following studio: Urban Community Architecture Studio I and II. Digital Media and Technology Studio I and II. Environmental Design and Technology Studio I and II. Building Construction and Structural Design Studio I and II.
ARC 446	Architectural Design VI	Continuation of ARC 445
ARC 492	Building Cost Estimation	Studies include introduction into organizational and financial concerns for buildings; interior architects, architects, engineers and builders relationships; organization of their work; studies of cost estimation according to material prices, wages, instrument, and management costs in various type of buildings. Studies of other factors that influence initial costs such as construction contract liability, special specification contact liability, special specifications, and labor
ARC 493	Construction Management	Studies include introduction into Professional ethics and legal aspects, which include codes of ethics and conducts, architect's responsibilities, the evolution of the profession and today's career options, construction planning and control by critical path method, etc. Laws involving architectural practice; namely building controls and professional controls. Others may involve zoning environmental protection, and energy conservation laws, Liability in faulty design involved with tort and criminal law, contract laws and regulations, building regulations with history and intent of regulations.
ARC 494	Professional Practice	Studies include (1) Professional ethics, which include codes of ethics and conducts, architect's responsibilities, the evolution of the profession and today's career options etc. (2) Laws involving architectural practice; namely building controls and professional controls. Others may involve zoning environmental protection, and energy conservation laws; etc. Liability in faulty design will also involve tort and criminal law. (3) Architectural practice including forming organizational management teams, design contracts, work process, preparation of bidding, contract and construction documents, roles and responsibilities of an architect as a designer in construction project.
CMD 121	History of Communication Tools, Technology and Media	History of communication and development of communication tools, technology and media. Impact on society and culture based on a series of case studies.

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CMD 212	Communication and Visual Representation	Visual representation in human communication. Ways in which objects, people, events, processes and ideas can be represented visually.
CMD 213	Communication with Sequence, Sound and Motion	Audiovisual communication artifacts and systems. Principles of design with motion and sequence sound. Narrative techniques.
CMD 222	Theory of Communication	Theories of human communication and design. Information, semiotic, rhetorical and cognitive models of communication.
CMD 223	Design, Media and Culture	Culture from contemporary and historical perspectives. Theories and analysis of material and visual culture. Design as a mode of cultural production.
CMD 231	Research Methodology	Appropriate research methods for communication design. Visual exploration, research and development of ideas. Design as a tool of inquiry and means of ideation.
CMD 232	Design Methodology	Creative design processes. Reflective writing and verbal and visual presentations.
CMD 242	Tools and Technology for Text and Images	Analogue and digital tools. Manipulation and production of typographic artifacts and media. Technological and formal aspects of typography and imagery.
CMD 243	Combining media	Tools and techniques of audio-visual sequences. Fundamentals of digital software, hardware and related analogue techniques. Key processes, structure and roles in professional contexts.
CMD 314	Communication and Interaction	Development of a personal creative methodology. Critical analysis, reflection of initial concepts, expressed as communication and interactive forms. Development of strong sense of individual creative identity.
CMD 315	Communication with Form and Space	Creative methodologies developed in Communication and Interaction. The relationship between Form and Space. Multiple interpretations including cultural, social and environmental issues expressed through design practice. Integration with Post Production Technology course. Development of project presentational skills.
CMD 326	Culture and Identities	Theories of culture and identity within social sciences and psychology.
CMD 345	Simulation and Modeling	Creation of 3D models and prototypes. Ways of simulating objects, environments and experiences using both analogue and digital media. Use of materials and structures as media for development of ideas, and use of models and simulations as tools for planning and realizing projects.
CMD 346	Post Production Technology	The study of the various areas of postproduction introduces film, video, print and spatial design. The class emphasizes the development of professional standards of postproduction, presentation and packaging of creative work.
CMD 351	Precedent study	Range of possible career directions for communication designers in Thailand and South East Asia. Preparation for the forthcoming Cooperative Study/ Internship.
CMD 352	Professional, Legal and Ethical Issue	Professional, legal and ethical issues relevant to professional design practice.
CMD 401	Communication Design Project Preparation	Preparation for Communication Design Project CMD402. Development of an intellectual, formal and pragmatic framework.

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CMD 402	Communication Design Project	Self-directed project contextualized in various ways; theoretically, professionally and culturally.
CMD 454	Communication Design Seminar	Student-led discussions critiquing ideas and practices in CMD 401 Communication Design Project Preparation. Emphasizes reflective practice and integration of theory and practice. Sharpens expertise in presentation and argumentation.
CMD 455	Preparation for Professional Life	Structured reflection of post-program futures. Synthesis of academic, professional and personal program experiences. Articulate personal goals and objectives.
INA 211	Color, Materials and Presentation	Studies include the development of personal skills in making presentations of interior architecture: methods of drawing, rendering, graphics, use of corresponding materials, and new techniques including computer rendering. The course also contains the basics of color and characteristic of surface materials, their applications, technology, psychological response; and also the application, theoretical and practical, in the field of interior architecture.
INA 242	Architectural Design II	Foundations includes spatial design and architectural studies. Intervention between body, culture and technology. Exploration and investigation on the relationship between interior space and architectural elements: how the program in the interior space reflects the architecture of the building. Sketches. Physical models. Technical Drawings. Focusing on transitional space between the home and the workplace.
INA 311	Ergonomics: Safety and Human Disabilities	The course includes the effects environment, interiors and furnishings have on the human body; concerns regarding the safety of designs; safety of building systems; maintenance as they effect normal performance; and current information regarding safety and disability laws (basic considerations in design of physically impaired).
INA 312	Spatial Perception & Psychology	Studies include the review of fundamental concepts of psychology; psychological factors and their impact on human behavior and space; processes of human behavior, perception, cognition and affects and conceptual systems; spatial behavior; psychological principles in color and form design.
INA 333	Architectural Project Programming and Space Planning	Studies include the methodology of gathering, analyzing, projecting and synthesizing information as gained through interview , questionnaires, and observation for the purpose of establishing an interior architecture project's program.
INA 343	Interior Architectural Design II	Design agenda focusing complex programs operating within interior space and architectural features. Interior architectural design of community space. Interior architectural design of educational space. Emphasis is placed on materials, light, color, mechanical systems, safety, appropriateness to architectural design.
INA 344	Interior Architectural Design IV	Studies include specific projects relating to Design agenda of complex programs operating within interior space and architectural features. Interior architectural design of retail spaces. Interior architectural design of hotel. Interior architectural design of workplace. Emphasis is placed on materials, light, color, engineering systems? safety, appropriateness to architectural design.
INA 352	Lighting Design	Studies include the application of typical lighting systems into complex interior architectural projects; basic theatre lighting design; as applied to museums, clubs, etc. advanced lighting systems and their applications.

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INA 363	Interior Architectural Material and Furnishing	Material and furnishing for Interior architecture design. Material properties. Material and furnishing classification for Interior construction and decoration. Type of material. Design application for functional purpose and decoration purpose.
INA 373	Interior Architecture Construction and Detailing	Studies include the study and exercises of more intricate constructions and details of architectural building, with emphasis on interior detailing and materials.
INA 435	Research Methods for Interior Architecture	This course outlines important relations between research and design works for Interior Architecture students. The coursework introduces students to the variety of 'research methods' which can and may induce creativity and innovation in the field of design and architecture. The course encourages students to learn and to try-out different research methods which are relevant to their research interests and design. This course is designed to help senior students: (1) formulating the topic of their thesis; (2) finding suitable methods of inquiry to investigate a particular issue, problem, or question; and (3) using relevant information to produce incisive projects and thesis.
INA 445	Interior Architectural Design V	Studies focus on advanced interior architectural design I that enables students to focus on their own interests relating to the field of interior architecture with his/her selected choice of design studio units. Design development process and relating various spatial concerns is on psychology, living and working habits, and specific needs. Emphasis is placed on spatial design potentials in an architectural context with thorough analysis of all related elements, related theoretical studies and applying the knowledge studying from the previous semesters.
INA 446	Interior Architectural Design VI	Studies focus on advanced interior architectural design II that enabling students to focus on their own interests relating to the field of interior architecture with his/her selected choice of design studio units. Design development process and relating various spatial concerns is on psychology, living and working habits, and specific needs. Emphasis is placed on spatial design potentials in an architectural context with thorough analysis of all related elements, related theoretical studies and applying the knowledge studying from the previous semesters.
INA 457	Furniture Design and Workshop	Studies include the examination and process of furniture design and development; the technical aspects of furniture construction; hands-on application of wood joinery, metal application, and plastic molding and production.
INA 464	Interior Shop Drawing and Detailing	Studies include the procedure in detailed drawings for the construction of other related works including field studies on some exemplary projects in order to develop insights into realistic situations.

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INA 494	Interior Specifications, Cost Estimation and Construction Management	Studies include the research, cost analysis and detailed specification for all elements of the interior environment; production and labor standard; material and labor estimation for interior construction; schematic outlines, preliminaries for approval, bidding process and alternatives; analysis and synthesis of bids; segmented awards and follow through, Studies also include cost estimation according to materials prices, wages, instruments and management costs in various types of buildings; factors that influence initial costs, i.e. construction contract liability, special specification contract liability, special specifications, and labor. The courses also includes introduction into the business aspects of construction management; organizational and financial concerns during entry into business and continued operation; interior architects, architects, engineers and builders relationships; organization of their work; construction planning and control by critical path method; contracts and tendering; control tools; construction laws and regulations; safety in construction.
INA 496	Code of Conduct for Interior Architecture	Studies professional ethics, which include codes of ethics and conducts, architect's responsibilities, the evolution of the profession and today's career options etc. Laws involving architectural practice; namely building controls and professional controls. Others may involve zoning environmental protection, and energy conservation laws; etc. Liability in faulty design will also involve tort and criminal law. And also architectural practice including forming organizational management teams, design contracts, work process, preparation of bidding, contract and construction documents, roles and responsibilities of an architect as a designer in construction project
INA 593	Interior Architectural Seminars	Studies include the discussion of interior architecture Studies include the discussion of interior architecture projects and their problems in construction, with professional and industry practitioners. Students will be expected to know and understand basic concepts and design philosophy, which are reasonable and relevant in all Interior Architectural construction systems.
IND 101	Industrial Design Fundamentals	Purpose and importance of design. Industrial design processes: work management, research for design, specification of design outcome, idea generation, concept development, design evaluation, decision making, communication of design. Tools and techniques for design. Drawings. Mock-up and model making. Design for aesthetics: form, size, proportion, color and material.
IND 102	Industrial Design and Manufacturing	Industrial design project for manufacturing. Product development. Materials and manufacturing processes. Communicating design, materials and manufacturing processes.
IND 111	Industrial Design Illustration	Various techniques and media of industrial design sketching and drawing.
IND 112	Materials and Manufacturing Processing	Wood, plastics, metals and composites in design. History of materials. Material properties. Manufacturing processes related to the materials. Design applications.
IND 113	Communication for Manufacturing	Industry-standard technical communication for manufacturing. Drawing with conventional media and computer-aided design software for communicating design and related technical details.
IND 121	Product Life Cycle	Introduction to products and services. Stages of product life cycle. Effects of product life. Product analysis. System thinking.

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IND 122	Introduction to Art	Definition of Art. History of Art. Art forms, genres, styles and media. Purpose of Art. Learning art through experience, exploration and experimentation.
IND 123	Design History and Culture	Prerequisite: none Design history and culture. Diversities of cultural needs corresponding to design movements. Paradigm shifts in design movements. Effects of design on society and culture. Effects of society and culture on design. Impact of industrial design on Asian societies.
IND 201	Industrial Design and Human Factors	Prerequisite: none User-centered design project. Application of physical, psychological, cognitive, social and cultural human factors in design processes: user research, finding design opportunities, design concept and development, and design validation. Communicating design for functionality, usability, suitability, feasibility and desirability.
IND 202	Industrial Design and Marketing	Prerequisite: none Marketing-focused design project. Application of business and marketing knowledge to market-driven design development. Communicating competitive product and service design.
IND 214	Marketing and Economics	Basics of Economics. Macroeconomics. Microeconomics. Demand and supply chain. Basics of marketing. Marketing research. Marketing planning. Business planning for products and services.
IND 217	Physical Human Factors	Physical human factors and design application. Ergonomics. Dimensions and movement of human body. Human perceptual systems. Static and dynamic anthropometry. Human characteristics and behavior. Effects of stress, fatigue, comfort, and other physical human factors associated with human effort in the use of products
IND 218	Psychological and Cognitive Human Factors	Psychological and cognitive human factors in design. Perception, sensory and interaction. Learning process. Cognition. Memory. Motivation. Emotion. Attitude. Personality. Application of appropriate research, design and user testing for interface and interaction design.
IND 219	Social and Cultural Human Factors	Social and cultural human factors in design. Social and cultural theoretical approaches and frameworks for design. Principles of research, design and validation for context-based product, service and system.
IND 223	Research for Design	Research for design and human factor subjects. Quantitative and qualitative research methodology, methods and techniques. Research process: research planning. data collection, analysis, research communication and research report.

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IND 224	Moral, Legal and Professional Practice	Role and responsibility of designer. Laws, rules and regulations for design profession. Industrial design professional practice and culture.
IND 225	Introduction to Graphic Design	Principles of graphic design. Typography. Visual variables. Grid system. Graphic information organization. Symbol and logo design. Corporate identity and branding. Production process in print media.
IND 301	Collaborative Product Development I	Project based learning. Practice with real design work in terms of knowledge, methods and tools. Collaborative design projects with external partners. Multidisciplinary work. Various possible project topics, scope of work and stages of design.
IND 302	Collaborative Product Development II	Project based learning. Practice with real design work in terms of knowledge, methods and tools. Collaborative design projects with external partners. Multidisciplinary work. Various possible project topics, scope of work and stages of design.
IND 321	Sustainable Design	Principles of Sustainability: "Planet", "People" and "Profit". Importance of sustainable development. Roles and responsibility as individuals and designers towards sustainable development. Different sustainable design approaches. Application of sustainable design knowledge into practice. ☒
IND 322	Design and Society	Expanding the borders of industrial design to social context. Social innovation. Open source design. Design for future. Collaborative design. Learning from one another. Design as a tool for self-improvement. Design and politics. ☒
IND 401	Collaborative Product Development III	Project based learning. Practice with real design work in terms of knowledge, methods and tools. Collaborative design projects with external partners. Multidisciplinary work. Various possible project topics, scope of work and stages of design.
IND 421	Creative Entrepreneurship	Starting and running design business. Creative economy. Characteristics and opportunities of design-driven business. Business planing. Investment. Research and development. Manufacturing.
IND 423	Seminar	Critical thinking related to design professional, contemporary design issues, ethics, economy, politics, technology and culture.