

WOOD SCIENCE AND ENGINEERING (WSE)

WSE LDEA, LOWER DIVISION ED ABROAD, 0-16 Credits

This course is repeatable for 99 credits.

WSE UDEA, UPPER DIVISION ED ABROAD, 0-16 Credits

This course is repeatable for 99 credits.

WSE 007, +BEYOND OSU I: PREPARE, 0 Credits

Explore career goals and interests. Emphasize and build National Association of Colleges and Employers (NACE) career competencies through OSU and related experiences. Relate career development concepts to career goals. CROSSLISTED as FE 007/FOR 007/WSE 007.

Attributes: CSC1 – Core Ed - Beyond OSU Career Preparation

Prerequisite: CORE 100 (may be taken concurrently) with D- or better or CORE 300 (may be taken concurrently) with D- or better or BA 100 (may be taken concurrently) with D- or better or BA 300 (may be taken concurrently) with D- or better or ED 100 (may be taken concurrently) with D- or better or ED 300 (may be taken concurrently) with D- or better or ENGR 110 (may be taken concurrently) with D- or better or ENGR 110H (may be taken concurrently) with D- or better or ENGR 310 (may be taken concurrently) with D- or better or LA 100 (may be taken concurrently) with D- or better or LA 300 (may be taken concurrently) with D- or better or SCI 100 (may be taken concurrently) with D- or better or SCI 300 (may be taken concurrently) with D- or better or Baccalaureate Core Student with a score of 1

Equivalent to: FE 007, FOR 007

Available via Ecampus

WSE 008, +BEYOND OSU II: ENGAGE, 0 Credits

Engage in career-related experiences or activities to gain insights into postgraduation careers. Apply career development concepts to future goals. CROSSLISTED as FE 008/FOR 008/WSE 008.

Attributes: CSC2 – Core Ed - Beyond OSU Career Engagement

Prerequisite: FE 007 with SC or better or FE 101 with C or better or ENGR 102 with C or better or FOR 007 with SC or better or FOR 111 with C or better or NR 201 with C or better or WSE 007 with SC or better or WSE 111 with C or better

Equivalent to: FE 008, FOR 008

WSE 111, +WOOD INNOVATIONS FOR SUSTAINABILITY, 2 Credits

Explores renewable materials and their current applications in society. Covers a breadth of renewable materials use and exposes students to life cycle thinking. Provides insights into career opportunities in the forest products sector through interaction with professionals and experts in the field.

Attributes: CSC1 – Core Ed - Beyond OSU Career Preparation

Prerequisite: CORE 100 (may be taken concurrently) with D- or better or CORE 300 (may be taken concurrently) with D- or better or BA 100 (may be taken concurrently) with D- or better or BA 300 (may be taken concurrently) with D- or better or ED 100 (may be taken concurrently) with D- or better or ED 300 (may be taken concurrently) with D- or better or LA 100 (may be taken concurrently) with D- or better or LA 300 (may be taken concurrently) with D- or better or ENGR 110 (may be taken concurrently) with D- or better or ENGR 110H (may be taken concurrently) with D- or better or ENGR 310 (may be taken concurrently) with D- or better or SCI 100 (may be taken concurrently) with D- or better or SCI 300 (may be taken concurrently) with D- or better or Baccalaureate Core Student with a score of 1

WSE 112, SANDING AND FINISHING WOOD PRODUCTS, 2 Credits

Explores sanding and finishing techniques, grounded in a foundation of wood anatomy. Discusses changes in wood on a micro scale through sanding and application of finishes as well as reviews types of sandpaper, sanding tools, types of finishes, and basic finish chemistry. Demonstrates proper sanding techniques and how to select and apply appropriate finishes for different types of woodwork. Explains and examines health risks associated with sanding and finishing. Identifies appropriate PPE to carry out safe practices.

Available via Ecampus

WSE 210, +*BIOLOGY, STRUCTURE, AND UTILIZATION OF WOODY PLANTS, 4 Credits

Explores common plant-based materials commonly used to meet our fiber needs and products that are manufactured from these materials. Describes their growth, the various cell types that constitute plants we frequently utilize, and their arrangements within a stem. Describes important physical and mechanical properties of renewable materials and differences among different plant-based materials, in terms of their fiber characteristics and properties. Distinguishes a variety of plant-based products from those manufactured from wood.

Attributes: CFSI – Core Ed - Scientific Inquiry & Analysis; CPPS – Bacc Core, Perspectives, Physical Science

WSE 211, WOODTURNING WITH SCIENCE I, 4 Credits

An introduction to scientific woodturning. Students will get a grounding in tools, lathes, sharpening, and set-up, and then will transition into turning basic forms (spindle and bowl). Particular relevance will be placed upon grain orientation, wood moisture content, wood anatomy, wood chemistry, wood species and extractive effects, and how all of these attributed affect both form and function.

Equivalent to: ART 211

This course is repeatable for 8 credits.

WSE 225, BUILDING DESIGN INNOVATION WITH WOOD, 3 Credits

Critically examines basics of building design and the relevant technical requirements, the solutions available and the specific applications, with a focus on wood-based products and other ligno-cellulosic materials. Examines material properties and product specifications to evaluate and choose a given material for a specific application, adopting quantitative and qualitative criteria. Explores principles of sustainable design, with a focus on the impact of materials and products. Focuses on multi-disciplinary aspects of building design and construction that facilitate communication between manufacturers, architects, engineers, and clients.

WSE 240, +FUNGAL DECAY IN YOUR WORLD, 4 Credits

Examines processes of fungal decay which will be used as a template to describe fundamental biological principles including transcription, translation, DNA replication and cell division, cellular energy production and metabolic pathways. Describes microscopic, molecular and biochemical processes of fungal decay of common commodities used in day-to-day life by humans. Enables the recognition of fungal processes in the human world. Analyzes real-world fungal decay phenomena encountered in day-to-day life.

Attributes: CFSI – Core Ed - Scientific Inquiry & Analysis
Available via Ecampus

WSE 250, COMPUTER AIDED DESIGN OF WOOD PRODUCTS, 3 Credits

Provides students with the tools and techniques to design and render products, furniture, and structures using Solidworks, as well as create technical drawings that facilitate communication between designers, engineers, and clients. Develops techniques that are applicable to a wide variety of industrial CAD and product design industries worldwide.

WSE 266, HEMPOLOGY: THE INDUSTRIAL HEMP STORY, 3 Credits

Introduces the botany, biology and agronomy of the hemp plant, and the origins, historical contexts and implications of contemporary legal and social issues surrounding its use for food, fiber, and building products.
Available via Ecampus

WSE 299, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

WSE 320, ANATOMY OF WOODY PLANTS, 3 Credits

Describe the anatomy of plant-based materials commonly used by society. Recognize cell types present in the stem and bark of commercially important plants and their origins. Describe the function of cell types in hardwoods, softwoods and monocots. Identify common North American hardwoods and softwoods based on macro- and microscopic features.

Prerequisite: WSE 210 with C or better

WSE 321, WOOD CHEMISTRY, 3 Credits

Emphasizes chemical structures and chemical properties of renewable plant-based materials, especially wood, at the molecular level. Covers chemical compositions of different renewable materials. Discusses chemical and biochemical modifications and applications of renewable materials.

Prerequisite: CH 122 with D- or better or CH 202 with D- or better or CH 222Z with D- or better or CH 222HZ with D- or better or CH 232 with D- or better or CH 232H with D- or better

WSE 322, PHYSICAL AND MECHANICAL PROPERTIES OF WOOD, 4 Credits

Examines fundamental physics and mechanics as they apply to plant fibers, solid wood and bio-based composites, with focus on hygroscopicity, heat & mass transport, elasticity and strength of materials, and other mechanical properties. Emphasizes aspects of general physical and mechanical theories and models, less commonly covered in general physics or engineering mechanics classes, but necessary in description of complex materials obtained from forest and agricultural biomass.

WSE 324, PHYSICAL AND MECHANICAL PROPERTIES OF WOOD PRACTICUM, 4 Credits

Introduces basic lab routines, explains fundamental concepts of physical measurements and testing, relevant to integrated knowledge from WSE 321 and WSE 322. Provides fundamental lab literacy, basic understanding on practical interpretation and use of standards, provides deeper understanding of how chemistry, physics, and anatomy affect material properties of wood and wood-based materials. Uses wood and a range of wood-based materials such as hardwoods, softwoods, wood fibers, composite wood products (e.g., CLT, LVL, OSB, plywood, MDF, wood-plastic composites, paper, etc.) to examine the intricate relationships between fundamental properties and performance.

Prerequisite: WSE 321 with C- or better and WSE 322 [C-]

WSE 350, WOOD PRODUCTS STUDIO, 4 Credits

Explore fundamental woodworking from a furniture design perspective. Evaluate rough milled wood for best cuts and develop cut lists and designs for basic frame and panel furniture. Explore common joinery techniques and finishes. Analyze the relationships between wood extractives, wood grain direction, wood density, and construction techniques. Demonstrate proficiency in all major woodworking machines by squaring up stock and milling boards to precise dimensions. Demonstrate cause and effect relationships between wood and water in functional design. Design and produce a unique final furniture product.

Recommended: WSE 112

WSE 385, *EVALUATING SUSTAINABILITY THROUGH LIFE CYCLE ANALYSIS, 3 Credits

With increased focus on sustainability, it has become important to quantify a sustainability metric of a material, process, or a system. To that end an understanding of life cycle analysis (LCA) is needed that can be used to determine a sustainability metric. This Ecampus course presents the use of LCA to gain insights on the environmental and social impacts of the choices we make. (Bacc Core Course)

Attributes: CSST – Bacc Core, Synthesis, Science/Technology/Society
Available via Ecampus

WSE 392, *BAMBOOLOOZA: THE FASCINATING WORLD OF BAMBOO, 3 Credits

An exploration of the world of bamboo and its application to renewable products. This course provides an in-depth understanding of a renewable material bamboo from its native form to processed products. Additionally, this course discusses the utilization and perception of bamboo in different societies of the world. Taught via Ecampus only. (Bacc Core Course)

Attributes: CSST – Bacc Core, Synthesis, Science/Technology/Society
Available via Ecampus

WSE 399, SPECIAL TOPICS, 0-16 Credits

This course is repeatable for 16 credits.

WSE 401, RESEARCH, 1-16 Credits

Equivalent to: FP 401

This course is repeatable for 16 credits.

WSE 403, THESIS, 1-16 Credits

This course is repeatable for 16 credits.

WSE 405, READING AND CONFERENCE, 1-16 Credits

Equivalent to: FP 405

This course is repeatable for 16 credits.

WSE 406, PROJECTS, 1-16 Credits

Equivalent to: FP 406

This course is repeatable for 16 credits.

WSE 410, WSE INTERNSHIP, 1-16 Credits

This course is repeatable for 16 credits.

WSE 413, WOODTURNING WITH SCIENCE II, 4 Credits

An in-depth look at how character in wood (figure, spalting, knots, etc.) affects machinability and output in both functional and aesthetic turning. Students will work with a wide range of spalted wood types and figure across numerous species while working on advanced turning forms. Particular emphasis will be placed upon how figure affects grain orientation, how spalting affects density and stability, and how the challenges with character wood can be overcome without specialty tools.

Prerequisite: WSE 210 with C- or better and WSE 211 [C-]

Equivalent to: ART 413

This course is repeatable for 8 credits.

WSE 417, INTRODUCTION TO SCULPTURAL WOODTURNING, 4 Credits

Explore traditional woodturning styles from around the world. Synthesize styles from the North American Studio Woodturning Movement. Modify current styles with personal aesthetics to create studio woodturning work. Recognize the differences between craft, professional, and studio woodturning.

Prerequisite: WSE 211 with C- or better and WSE 413 [C-]

WSE 418, INTEGRATED SCULPTURAL WOODTURNING, 4 Credits

Synthesize personal style with historic work during object creation. Develop an independent sculptural style. Distinguish craft from sculptural work and the markets that support them. Investigate marketing opportunities based upon your style of work. Develop appropriate products for such spaces. Assemble a cohesive website and marketing plan in which you could thrive as an independent artist.

Prerequisite: WSE 417 with C- or better

WSE 425, TIMBER TECTONICS IN THE DIGITAL AGE, 4 Credits

An exploration of the advances in design, construction and fabrication of timber buildings. Includes experimentation with both physical and digital models and a final project, in collaboration with UO Architecture students.

Recommended: Junior standing and knowledge of CAD

WSE 430, FUNDAMENTALS OF ENGINEERING MECHANICS, 4 Credits

An introduction to fundamentals of engineering mechanics. While in most aspects the course follows standard introductory mechanics courses for engineers, special attention is paid to elasticity and strength in cellular and anisotropic materials like solid wood and bio-based composites. The overall objective of this course is to provide fundamental knowledge and practical skills in the area of engineering mechanics and mechanical principles behind some of the most important methods of characterization, processing, and utilization of renewable biomaterials; commonly used today, emerging and future.

Prerequisite: (MTH 254 with D- or better or MTH 254H with D- or better) and WSE 324 [C-]

WSE 453, ^FOREST PRODUCTS BUSINESS, 3 Credits

Provides students with the skills necessary to operate effectively in the global forest products industry.

Attributes: CSWC – Core Ed - Writing Intensive Curriculum (WIC); CWIC – Bacc Core, Skills, Writing Intensive Curriculum (WIC)

Recommended: ECON 201 and ECON 202

WSE 455, INDUSTRIAL MARKETING OF WOOD PRODUCTS, 3 Credits

Focuses on the written and oral communication skills necessary to apply basic concepts of marketing forest products. Critically examines real-world examples via guest industry speakers, relating coursework to the day-to-day work in business.

WSE 457, WOOD PRODUCTS SALES, 3 Credits

Introduces basic business practices in the wood products industry. Examines major product categories of the wood products industry and their applications. Explores the specific practices associated with selling wood products. Examines in-depth, the products and terminology unique to the sector, including export sales. Introduces the breadth of sales positions across the industry.

WSE 461, INTRODUCTION TO WOOD PRODUCTS MANUFACTURING, 4 Credits

First of a three-term series exploring technologies and management practices associated with manufacturing products from wood and other renewable materials. Covers major processing steps for the conversion of raw materials into products. Emphasizes major processing steps, equipment, and the impact of material properties on processing strategies.

Prerequisite: WSE 210 with C- or better

WSE 462, ADVANCED WOOD MANUFACTURING 1, 4 Credits

Second of a three-term series exploring technologies and management practices associated with manufacturing products from wood and other renewable materials. Explores advanced technologies and management practices associated with wood products manufacturing processes. Emphasizes process design, quality control, and continuous process improvement.

Prerequisite: WSE 461 with C- or better

WSE 463, ADVANCED MANUFACTURING 2, 4 Credits

Third of a three-term series exploring technologies and management practices associated with manufacturing products from wood and other renewable materials. Subjects covered include process control, optimization, automation, and contemporary topics such as Big Data and the Internet of Things and the potential impacts of the trends on manufacturing enterprises.

Prerequisite: WSE 462 with C- or better

WSE 465, WOOD PRODUCTS FIELD SCHOOL, 2 Credits

Provides first-hand experience of range of diverse wood products related industrial and commercial operations representing many parts of the renewable materials value chain. Provides insight into diversity in products and services, modes and scales of manufacturing operations related to wood products. Includes daily travel to industrial plants, mills workshops, art and craft studios, or related businesses and at least one overnight stay.

This course is repeatable for 4 credits.

WSE 470, *FORESTS, WOOD, AND CIVILIZATION, 3 Credits

Multidisciplinary examination of issues related to the roles of forests, trees, and wood in civilization, as providers of commodities, ecosystem services, and spiritual and artistic inspiration. Issues include global supply and demand, wood ownership and political power, and perceptions and uses of forest resources in different societies. (Bacc Core Course)

Attributes: CSGI – Bacc Core, Synthesis, Contemporary Global Issues

Equivalent to: WSE 470H

Available via Ecampus

WSE 471, RESIDENTIAL BUILDING CONSTRUCTION AND MATERIALS, 3 Credits

Explores material selection options, applications, and performance characteristics. Covers residential construction methods, including green building concepts, building codes, and project planning. Introduces concepts and interpretation of life cycle assessment.

WSE 499, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 99 credits.

WSE 501, RESEARCH AND SCHOLARSHIP, 1-16 Credits

Equivalent to: FP 501

This course is repeatable for 16 credits.

WSE 503, THESIS, 1-16 Credits

Equivalent to: FP 503

This course is repeatable for 999 credits.

WSE 505, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

WSE 506, PROJECTS, 1-16 Credits

This course is repeatable for 16 credits.

WSE 507, SEMINAR, 1 Credit

Equivalent to: FP 507

This course is repeatable for 99 credits.

WSE 510, INTERNSHIP, 1-6 Credits

WSE 513, WOODTURNING WITH SCIENCE II, 4 Credits

An in-depth look at how character in wood (figure, spalting, knots, etc.) affects machinability and output in both functional and aesthetic turning. Students will work with a wide range of spalted wood types and figure across numerous species while working on advanced turning forms. Particular emphasis will be placed upon how figure affects grain orientation, how spalting affects density and stability, and how the challenges with character wood can be overcome without specialty tools.

This course is repeatable for 12 credits.

Recommended: WSE 210 and WSE 211

WSE 516, INTRODUCTION TO SCULPTURAL WOODTURNING, 4 Credits

Explore traditional woodturning styles from around the world. Synthesize styles from the North American Studio Woodturning Movement. Modify current styles with personal aesthetics to create studio woodturning work. Recognize the differences between craft, professional, and studio woodturning.

Prerequisite: WSE 513 with B or better

This course is repeatable for 12 credits.

WSE 517, BEGINNING SEMINAR, 1 Credit

Explores skills necessary to create and deliver science-based presentations. Focuses on effective organization and messaging techniques, and confident verbal and non-verbal delivery. Helps students develop communication and public speaking skills in order to have active, meaningful engagement in classes and professional settings such as conferences.

WSE 523, WOOD AS A SUSTAINABLE MATERIAL FOR THE FUTURE I, 3 Credits

Describes how trees grow. Examines both the macro and microfeatures of wood, their impacts on material properties, processes and various product performance. Reviews the polymers (cellulose, hemicellulose and lignin) that form plant cell walls and their roles in determining wood properties. Examines the degradation processes of wood polymers caused by physical and biotic agents, assessing their impact on wood properties and performance.

Available via Ecampus

WSE 524, WOOD AS A SUSTAINABLE MATERIAL FOR THE FUTURE II, 3 Credits

Examines fundamental physics and mechanics as they apply to plant fibers, solid wood and bio-based composites, with focus on wood-water relations, insulation and selected structural properties of materials. Emphasizes aspects of applied physics, mechanics and models, less commonly covered in general physics or engineering mechanics classes, but necessary in description of complex materials obtained from forest and agricultural biomass.

Available via Ecampus

WSE 525, TIMBER TECTONICS IN THE DIGITAL AGE, 4 Credits

An exploration of the advances in design, construction and fabrication of timber buildings. Includes experimentation with both physical and digital models and a final project, in collaboration with UO Architecture students.

Recommended: Knowledge of CAD

WSE 526, STRUCTURAL HEALTH ASSESSMENT/MONITORING OF TIMBER BUILDINGS, 3 Credits

Holistic approaches for the evaluation of the performance of timber systems and structures in a building. Learn about the tools available to experts for different analysis purposes, and to understand how data acquired from different techniques can be analyzed and used to inform building management and maintenance, fabrication and construction practices, and future design.

WSE 540, INTRODUCTION TO WOOD SCIENCE & ENGINEERING, 2 Credits

Explores the breadth of wood sciences by exposing students to faculty expertise on wood properties and products. Analyzes key concepts/ issues associated with wood science. Examines basics of wood products in relation to markets and trade.

WSE 541, WOOD STRUCTURE, 4 Credits

Provides students with an overview of forest products globally and in Oregon, with a focus on common North American and Oregon hardwood and softwood species, utilized to meet our fiber needs. Describes the structure of wood and bark, the cell types present, their function and their arrangement within a stem at the macro- and micro-level, and explores how the arrangement of these cell types satisfies hydrologic and mechanical needs. Considers the influence of wood anatomy on product properties. Compares various types of atypical wood and how their properties impact product performance.

WSE 542, SCIENTIFIC METHODOLOGY IN PLANNING RESEARCH PROJECTS, 2 Credits

Provides basic theoretical knowledge and practical skills related to scientific methodology and planning as they apply to conduct graduate projects in technical sciences and engineering. Explains why we employ the methods that we do, why these decisions are important, and how they impact final results. Provides training in research ethics to be able to conduct scholarly and professional activities in an ethical manner.

WSE 543, FOREST SECTOR BUSINESS & SUSTAINABILITY, 2 Credits

Explores at multiple levels the complex confluence of forests, business, and sustainability. Critically analyzes the idiosyncratic context of the forest sector, prominent pathways to managing forest-dependent businesses, and the contribution of forest sector businesses to achieving Sustainable Development Goals. Examines markets for forest products and the companies that cater to those markets.

WSE 544, WOOD CHEMISTRY, 4 Credits

Explores the chemical makeup of lignocellulosic materials with a specific focus on wood. Critically analyzes products that can be made from renewable raw materials. Examines processes required to manufacture paper and wood chemical products.

Prerequisite: WSE 541 with C or better

Recommended: General Chemistry, Organic Chemistry

WSE 545, WOOD PHYSICS, 4 Credits

Examines fundamental physics as applied to plant fibers, solid wood and bio-based composites, with focus on hygroscopicity, heat & mass transport, and synthesis and application of principles to practical examples such as in wood drying or hot pressing. Explores general physical and mechanical theories and models are used to describe the behavior of biomaterials to the same degree as to all other materials. Explores the complexity of materials obtained from forest and agricultural biomass, including discussion of certain aspects of physical models and theories not commonly covered in general physics classes.

Prerequisite: WSE 541 with C or better

WSE 546, WOOD MECHANICS, 2 Credits

Explores at multiple levels the complex structure of wood and how it influences mechanical properties. Analyzes load response, stress, strain, and directional complexities. Critically examines mechanics of engineered wood composites, its strengths and weaknesses, in relationship to other commonly used building materials.

Prerequisite: WSE 541 with C or better

WSE 547, WOOD BIODETERIORATION & PRESERVATION, 2 Credits

Examines wood biodeterioration, biodegradation, and various methods for their prevention. Describes the biotic and abiotic agents of wood decay and requires students to compare and contrast them with respect to their impacts on wood. Describes the chemical properties and mode of action of common wood preservatives, wood protection systems, and wood modification technologies. Synthesizes base knowledge in wood preservative technology into novel creative methods for wood protection or environmental risk mitigation.

Prerequisite: WSE 541 with C or better

Recommended: Background knowledge in basic chemistry, introductory biology, and organic chemistry

WSE 548, WOOD IDENTIFICATION, 2 Credits

Explores and identifies the microanatomy of common commercial hardwoods and softwoods from around the world. Identifies key features in target wood species used in morphological identification. Evaluates the anatomy of differing wood species. Models the use of paper and digital databases for wood identification. Reviews current genetic and alternative methods wood identification.

Prerequisite: WSE 541 with C or better

WSE 553, FOREST PRODUCTS BUSINESS, 3 Credits

Provides students with the skills necessary to operate effectively in the global forest products industry.

Recommended: ECON 201 and ECON 202

WSE 558, WOOD DESIGN, 4 Credits

Study of basic wood properties and design considerations. Design and behavior of wood connectors, beams, columns and beam columns. Introduction to plywood and glued laminated members. Analysis and design of structural diaphragms and shear walls. CROSSLISTED as CE 584/WSE 558.

Equivalent to: CE 584

Recommended: CE 383 or CE 481 with a minimum grade of C

WSE 561, INTRODUCTION TO WOOD PRODUCTS MANUFACTURING, 4 Credits

First of a three-term series exploring technologies and management practices associated with manufacturing products from wood and other renewable materials. Covers major processing steps for the conversion of raw materials into products. Emphasizes major processing steps, equipment, and the impact of material properties on processing strategies.

Recommended: WSE 210

WSE 562, ADVANCED WOOD MANUFACTURING 1, 4 Credits

Second of a three-term series exploring technologies and management practices associated with manufacturing products from wood and other renewable materials. Explores advanced technologies and management practices associated with wood products manufacturing processes. Emphasizes process design, quality control, and continuous process improvement.

Prerequisite: WSE 561 with C or better

WSE 563, ADVANCED MANUFACTURING 2, 4 Credits

Third of a three-term series exploring technologies and management practices associated with manufacturing products from wood and other renewable materials. Subjects covered include process control, optimization, automation, and contemporary topics such as Big Data and the Internet of Things and the potential impacts of the trends on manufacturing enterprises.

Recommended: WSE 462

WSE 571, RESIDENTIAL BUILDING CONSTRUCTION AND MATERIALS, 3 Credits

Explores material selection options, applications, and performance characteristics. Covers residential construction methods, including green building concepts, building codes, and project planning. Introduces concepts and interpretation of life cycle assessment.

WSE 580, CIRCULAR ECONOMY: NARROWING RESOURCE LOOPS, 3 Credits

Explores strategies for optimizing resource flows in the wood-product industry. Analyzes current resource flows and their environmental impacts. Outlines approaches for certifying the sustainable sourcing of virgin fiber. Discusses alternative material sourcing. Analyzes the role of technology in improving manufacturing processes and systems for higher resource efficiency.

Available via Ecampus

WSE 581, CIRCULAR ECONOMY: SLOWING RESOURCE LOOPS, 3 Credits

Examines and analyzes solutions aimed at prolonging the lifespan of wood products, thereby reducing or preventing waste resulting from their disposal. Discusses technical solutions to enhance the durability of wood products and explores their effects on product performance and life cycle impacts. Examines design strategies to enhance durability of wooden structures. Introduces methods for collecting data on parameters that influence durability. Introduces approaches for service life planning and maintenance strategies.

Available via Ecampus

WSE 582, CIRCULAR ECONOMY: CLOSING THE LOOP, 3 Credits

Analyzes wood waste streams and their management approaches. Analyzes criteria and techniques of wood cascading. Analyzes criteria and techniques for composting and to enhance biodegradability. Describes techniques to recycle or remanufacture biomass and wood waste. Discusses criteria to enable reuse by design.
Available via Ecampus

WSE 583, SUSTAINABILITY & NATURAL RESOURCE-BASED ORGANIZATIONS, 3 Credits

Explores issues around sustainable natural resource-based organizations and improving the sustainability of their operations. Analyzes the critical role in which natural resource-based organizations play in helping protect the physical environment. Discusses novel paradigms to overcome the challenges in sustainability management. Provides knowledge and tools to develop a sustainability plan for a natural-resource-based organization for transitioning to a circular bioeconomy that is sustainable, inclusive, and just.

WSE 590, MASS TIMBER PRODUCTS & BUILDING SYSTEMS, 3 Credits

Introduces Mass Timber Products and building systems. Describes use of different mass timber products in multi-family and non-residential buildings.
Available via Ecampus

WSE 591, THE EVOLVING MASS TIMBER SECTOR, 3 Credits

Traces the history of Mass Timber products. Highlights how cross-laminated timber (CLT) changes the way wood has been traditionally used for building. Discusses public policies, environmental laws and business models through the lens of the mass timber industry. Explores factors shaping possible future trends.

WSE 592, ADVANCED WOOD DESIGN, 4 Credits

Study of advanced concepts in wood properties and design. Design and analysis of specialty wood connectors. Design of wood members for adverse conditions including fire design. Common failure mechanisms and forensic engineering concepts. Design for durability. Lec/lab.
Recommended: Understanding of basic concepts in mechanics and timber design

WSE 593, INTRO TO QUALITY ASSURANCE & CONTROL IN MASS TIMBER MANUFACTURING, 3 Credits

Introduces quality assurance and control (QA/QC) in the wood products sector, and how it specifically applies to mass timber. Introduced a framework for understanding the details of QA/QC at the ground level as well as thinking about QA/QC at an organization level. Introduced to standards for mass timber processes and products qualification.
Recommended: Knowledge of statistics equal to a first year university course (ST 243Z) and an upper-division statistics course (such as ST 411 or ST 421)
Available via Ecampus

WSE 594, DIGITAL DESIGN & FABRICATION OF TIMBER STRUCTURES, 3 Credits

Introduces the basic concepts in digital design and fabrication of timber structures such as computer-aided design (CAD), computer-aided manufacturing (CAM), computer numerical control (CNC) technology, supply chain considerations, robotics, and other machine and digital technologies.
Recommended: Basic understanding of general construction terms and prior computer-aided-design experience

WSE 595, MASS TIMBER CONSTRUCTION, 3 Credits

Introduces the unique features of building with mass timber. Discusses how mass timber construction differs from light frame, and describes considerations that need to be taken into account for each step of the construction phase.

WSE 596, MASS TIMBER ENGINEERING & CONNECTION DESIGN, 3 Credits

Assesses intricacies of mass timber engineering and explores its uniqueness. Evaluates, analyzes, and designs connection systems for mass timber applications. Discusses recent and on-going code changes and technical developments for connection design.

WSE 599, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 99 credits.

WSE 601, RESEARCH AND SCHOLARSHIP, 1-16 Credits

Equivalent to: FP 601
This course is repeatable for 16 credits.

WSE 603, THESIS, 1-16 Credits

Equivalent to: FP 603
This course is repeatable for 999 credits.

WSE 605, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

WSE 606, PROJECTS, 1-16 Credits

Equivalent to: FP 606
This course is repeatable for 16 credits.

WSE 607, SEMINAR, 1 Credit

Section 1: Beginning Seminar. Section 2: Graduate Seminar.
Equivalent to: FP 607
This course is repeatable for 99 credits.

WSE 617, BEGINNING SEMINAR, 1 Credit

Explores skills necessary to create and deliver science-based presentations. Focuses on effective organization and messaging techniques, and confident verbal and non-verbal delivery. Helps students develop communication and public speaking skills in order to have active, meaningful engagement in classes and professional settings such as conferences.

WSE 699, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.