

**Curriculum of Master of Science Program
In Environmental Management
(Revised Curriculum 2021)**

Academic Institution **Prince of Songkla University, Hatyai campus
Faculty of Environmental Management**

Section 1 General Information

1. Curriculum Name and Program

- Master of Science Program in Environmental Management Management

2. Name of Academic Degree and Program

2.1 Master of Science

Full Title: Master of Science (Environmental Management)

Abbreviation: M.Sc. (Environmental Management)

Section 2 Curriculum Structure

1. Curriculum Master of Science program

Plan A; A1	36 credits
-Thesis	36 credits
Plan A; A2	36 credits
-Compulsory courses	9 credits
-Elective courses	3 credits
-Thesis	24 credits
Plan B	36 credits
-Compulsory courses	15 credits
-Elective courses	15 credits
-Minor Thesis	6 credits

Study Plan for Master of Science program

Plan A; A1

Thesis 36 credits

First Year, Semester 1

820-801 Thesis 9 credits

First Year, Semester 2

820-801 Thesis 9 credits

Second Year, Semester 1

820-801 Thesis 9 credits

Second Year, Semester 2

820-801 Thesis 9 credits

Total credits

36 credits

Plan A; A2

Thesis 36 credits

First Year, Semester 1

820-501 Environmental Impact Assessment 3 credits

820-502 Research Methodology for Environmental Management
and Seminar 3 credits

820-503 Holistic Environmental Management in Digital Era 3 credits

820-xxx Elective 3 credits

First Year, Semester 2

820-800 Thesis 8 credits

Second Year, Semester 1

820-800 Thesis 8 credits

Second Year, Semester 2

820-800 Thesis 8 credits

Total credits

36 credits

Plan B**Thesis 36 credits****First Year, Semester 1**

820-501 Environmental Impact Assessment	3 credits
820-502 Research Methodology for Environmental Management and Seminar	3 credits
820-503 Holistic Environmental Management in Digital Era	3 credits
820-xxx Elective	3 credits
820-xxx Elective	3 credits

First Year, Semester 2

820-504 Public Policy for Sustainable Cities and Communities	3 credits
820-505 Circular Economy	3 credits
820-xxx Elective	3 credits
820-xxx Elective	3 credits
820-xxx Elective	3 credits
OR 820-xxx Module	9 credits

Second Year, Semester 1

820-802 Minor Thesis	3 credits
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Second Year, Semester 2

820-802 Minor Thesis	3 credits
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Total credits**36 credits**

Courses (Master of Science program)

Compulsory courses Plan A ;A2

820-501	Environmental Impact Assessment	3((3)-0-6)
820-502	Research Methodology for Environmental Management and Seminar	3((3)-0-6)
820-503	Holistic Environmental Management in Digital Era	3((3)-0-6)

Compulsory courses Plan B

820-501	Environmental Impact Assessment	3((3)-0-6)
820-502	Research Methodology for Environmental Management and Seminar	3((3)-0-6)
820-503	Holistic Environmental Management in Digital Era	3((3)-0-6)
820-504	Public Policy for Sustainable Cities and Communities	3((3)-0-6)
820-505	Circular Economy	3((3)-0-6)

Elective course

- Discipline: Environmental Science and Technology

820-510	Sustainable Industrial Environmental Manager	3((3)-0-6)
820-511	Geographic Information System for Environmental Management	3((3)-0-6)
820-512	Disaster Management	3((3)-0-6)
820-513	Soil Degradation and Management	3((3)-0-6)
820-514	Sustainable Watershed Management	3((3)-0-6)
820-515	Air Pollution and Control	3((3)-0-6)
820-516	Climate Change and Ecosystem	3((3)-0-6)
820-517	Environmental Applications of Instrumental Analysis	3((3)-0-6)
820-518	Integrated Marine and Coastal Resources Management	3((2)-2-5)
820-519	Environmental Regeneration	3((3)-0-6)

- Discipline: Environmental Social Science and Environmental Study

820-520	Innovative Education for Sustainable Future	3((3)-0-6)
820-521	Sustainable Development Goals (SDGs)	3((3)-0-6)
820-522	Ecological Thinking Benefit for All Kinds	3((3)-0-6)
820-523	Environmental Law and Human Rights	3((3)-0-6)
820-524	Community Adaptation to Global Environmental Change	3((3)-0-6)
820-525	Module: Green City and Community Development	9((4)-15-8)

- Discipline: Environmental Economics

820-530	Design Innovation and Business for Sustainability	3((3)-0-6)
820-531	Entrepreneurship and Social Enterprise for Environmental Management	3((3)-0-6)
820-532	Business Modeling and Digital Transformation for Environmental Management	3((3)-0-6)
820-533	Media and Communication for Environmental Management	3((3)-0-6)
820-534	Marketing and Branding for Environmental Management	3((3)-0-6)
820-535	Module: Green Business and Design for Environment	9((4)-15-8)

- Discipline: Environmental Innovation and Sustainability

820-540	Data Science and Model for Environmental Management	3((3)-0-6)
820-541	Internet of Things (IoT) in Environmental Management	3((3)-0-6)
820-542	Sustainable Innovative Water Management	3((3)-0-6)
820-543	Innovative Waste Management and Utilization	3((3)-0-6)
820-544	Innovative Wastewater Management: Treatment and Recovery	3((3)-0-6)
820-545	Biofuel Technology	3((3)-0-6)
820-546	Polymers and The Environment	3((3)-0-6)
820-547	Module: Industrial pollution management	9((4)-15 -8)

- Discipline: General

820-550	Special Topics in Environmental Management I	3((3)-0-6)
820-551	Special Studies in Environmental Management II	3((3)-0-6)

Thesis

820-800	Thesis	24(0-72-0)
820-801	Thesis	36(0-108-0)
820-802	Minor Thesis	6(0-18-0)

***Note. Students may select any course offered for Master degree or Doctoral degree in Prince of Songkla University curriculum. However, the selected course must be approved by curriculum supervisor or thesis advisor.**

Course Descriptions

- 820-501 Environmental Impact Assessment 3((3)-0-6)
Principles and concepts of strategic environmental assessment (SEA), environmental impact assessment (EIA) and health impact assessment (HIA); assessment methodology; mitigation and monitoring measures; regulations and policies relating to environmental assessment; report production; case studies and field trip
- 820-502 Research Methodology for Environmental Management and Seminar 3((3)-0-6)
Environmental research process; formulating research questions and hypotheses; literature reviews; quantitative and qualitative research designs; constructing and verifying the quality of research tools; data collection, data analysis and interpretation; writing reports; evaluation and critical appraisal; research ethics; Presentation, analysis and discussion of interesting and current topics in environment and presentation of conceptual framework and/or thesis proposal and/or research results
- 820-503 Holistic Environmental Management in Digital Era 3((3)-0-6)
Concepts for interdisciplinary sustainable environmental management; environmental technology; pollution control; sustainable consumption and production; innovative and smart technology for pollution and waste management; innovative and smart technology and design for sustainable energy management; strategic environmental assessment; reinventing, rethinking and redefining environmental management system; behavior management; environmental law, policy and governance
- 820-504 Public Policy for Sustainable Cities and Communities 3((3)-0-6)
Public policy, good governance, community participation and social capital in environmental management; urban governance; sustainable urban management; city and climate change mitigation/adaptation; innovative governance in urban management; case studies of local governance innovationsustainable resource management and planning through environmental modeling; assessment of potential of environment and forecast of future environment; ethics and governance; regional and global challenges
- 820-505 Circular Economy 3((3)-0-6)
Green economy; Impacts from a linear conventional economy; Ecosystem as an interdependence life support for economy (ecosystem service, ecosystem service valuation, payment for ecosystem services); Circular economy as a means to sustainable economy (low carbon, equitable society, sustainable economy); Maximize resource efficiency and waste management (production, distribution, consumption); Reuse, repair, remanufacture, recycle, regenerate, rehabilitate materials and resources (principles and design solutions); Analysis of various successful and inspiring case studies: Lesson for future design (methods and tools from

product design, production engineering, waste management, industrial ecology, supply chain and change management and policy)

- Discipline: Environmental Science and Technology

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| 820-510 | Sustainable Industrial Environmental Manager | 3((3)-0-6) |
| | Environmental management and sustainability; sustainable business/governance, policy, regulation and legislation; Environmental Management Systems (EMS); management for health and safety; environmental impact assessments; control of emissions to air; control of contamination to water source; control of waste and land use; sources and use of energy and energy efficiency; control of environmental noise; emergency planning for and dealing with the environment; innovative and leading practices; analytical thinking; problem reframing and resolution; effective communication; relationship development; resilience risk and continual improvement; leadership for change; environmental practical application | |
| 820-511 | Geographic Information System for Environmental Management | 3((3)-0-6) |
| | Principles of geographic information system (GIS); concepts, design and management of spatial database for environmental management; theories and techniques for spatial data input, management and analysis; spatial data precision, errors and corrections; modeling and decision support systems | |
| 820-512 | Disaster Management | 3((3)-0-6) |
| | Types, characteristics, causes and effects of natural disaster (e.g. flood, cyclone, earthquakes, landslides, coastal erosions, etc) and man-made disaster (e.g. fire, industrial pollution, nuclear disaster; biological disasters; accidents (air, sea, rail and road), structural failures, war and terrorism, etc); Risk and vulnerability analysis; Disaster management plan; Response to disaster; Rehabilitation, reconstruction and recovery | |
| 820-513 | Soil Degradation and Management | 3((3)-0-6) |
| | Soil ecosystem; soil composition; soil properties (physical, chemical, biological characteristics), soil degradation; top soil loss; soil pollution; the contamination of pesticides, heavy metals and other toxic substances; impacts for human and ecosystem; methods of soil quality indicators analysis and standards; sustainable soil management; soil remediation; case study of the contaminated soils in Southern Thailand | |
| 820-514 | Sustainable Watershed Management | 3((3)-0-6) |
| | Principles and concepts of watershed management; Watershed Analysis, Physical characterization, hydrological processes, runoff and soil loss, watershed degradation; Watershed planning and planning tools; Watershed management activities, watershed rehabilitation | |

820-515 Air Pollution and Control 3((3)-0-6)
Sources of air pollution and their control; types, characteristics and dispersion of air pollutants; air pollution meteorology; effects of air pollution on human and environment; sampling and analytical techniques of air pollutants; air quality standards; regulations and policies relating to air pollution; air pollution control equipment

820-516 Climate Change and Ecosystem 3((3)-0-6)
Overview of climate change science; energy balance and radiative transfer; greenhouse effect and global warming; natural causes of climate change; paleoclimate and future climate changes; climate model; assessment of climate change induced by anthropogenic causes; exchanges, sources and sinks of greenhouse gases in the ecosystem; impact of climate change on the ecosystem and biodiversity; adaptation and vulnerability of the ecosystem

820-517 Environmental Applications of Instrumental Analysis 3((3)-0-6)
Instrumentation theories; principles descriptions and applications in environmental; analytical methods based on absorption and emission spectrometry, atomic and molecular photoluminescence spectrometry, ion-selective electrode, voltammetry, high resolution gas-chromatography, high performance liquid chromatography and thermal analysis; applications of instrumental methods in electrochemistry and related techniques

820-518 Integrated Marine and Coastal Resources Management 3((2)-2-5)
Principles of marine and coastal resources utilization by integrating ecosystem services dimension; sustainable marine and coastal resource development and management; impact dimensions of pollution and wastes on marine and coastal resources with the emphasis on community participation in marine and coastal resources management

820-519 Environmental Regeneration 3((3)-0-6)
Environmental regeneration due to the past human activities, forest and landscapes regeneration and protect wildlife in intact ecosystems, restoration of the river, beach regeneration; sustainable food production; remediation of soil degradation; sustainable regeneration in urban areas; socio-economic, health and, educational benefits of environmental regeneration

- Discipline: Environmental Social Science and Environmental Study

820-520 Innovative Education for Sustainable Future 3((3)-0-6)
Concepts, techniques, methods, tools for constructing innovative learning process on sustainable future; environmental awareness building; development of environmental activities and participations for environmental management; construction of educational materials for formal and informal educational system

820-521 Sustainable Development Goals (SDGs) 3((3)-0-6)
 Concepts of sustainable development at different geographical scales (local, national and international); Origin, goals and challenges of sustainable development; framework of sustainable development goals (SDGs); Interconnection among SDGs; SDGs and environmental management

820-522 Ecological Thinking Benefit for All Kinds 3((3)-0-6)
 Reawakening and awareness of ecological value; Deep Ecology; Intrinsic value of all kinds; Harmonious living with ecosystem and nature for the benefit of all kinds; Ecological footprints of individual and organization; Responsible behavior and decisions with ecological impact in mind; Using creative mind to organize activities that benefit for all kinds

820-523 Environmental Law and Human Rights 3((3)-0-6)
 Laws and measure concerned with natural resources and environment; pollution prevention, control and remediation; problems and limitations in enforcing laws and measures; as well as implementing agencies or organizations; Human rights as an individual and community to protect the environment and to live in good environment so called environmental rights, concept, declaration and international agreements pertaining to Thai society, including policy, measures, legislation and related organizations in Thailand

820-524 Community Adaptation to Global Environmental Change 3((3)-0-6)
 Community study by participation process; risk profile and vulnerability assessment together with academic methods and local wisdom to cope with global environmental change and socio-economic change; analysis of adaptive capacities of community; development of policy and plan in community adaptation among community leaders, local governance and academic institute.

820-525 Module: Green City and Community Development 9((4)-15-8)
 Concept and principle for sustainable community development; urban development; global urban situation; urban problem and environment; concept for sustainable community and urban management; public policy for urban development; innovation for community and urban management in Thailand and global; eco geomap development

- Discipline: Environmental Economics

820-530 Design Innovation and Business for Sustainability 3((3)-0-6)
 Sustainable design futures, trends, innovations and strategy; design thinking and strategic foresight; green products (concepts, materials, design, packaging) ; green entrepreneurship (digital business model; planning and new ventures; digital marketing; financial techniques for green startup)' intellectual properties management; data sciences and digital tools

- 820-531 Entrepreneurship and Social Enterprise for Environmental Management 3((3)-0-6)
 Meaning, principle and concepts of entrepreneurship and social entrepreneurship; Business structure, process and strategy used by entrepreneur and social entrepreneur; Entrepreneurial attributes, traits and skills for success; Environmental business opportunity identification; Business plan preparation; Entrepreneurial finance
- 820-532 Business Modeling and Digital Transformation for Environmental Management 3((3)-0-6)
 Principle, concept and framework of business model as key concept of strategic management; digital business model, environmental business model and innovative business model for environmental management; changes in world economy due to rapid digital transformation; roles of technology revolution in economy; components of digital economy's ecosystem; development of digital economy; challenges arising from global digital transformation; future opportunities and implications on environmental management
- 820-533 Media and Communication for Environmental Management 3((3)-0-6)
 Principles of advertising, journalism, media and society, public relations, telecommunication and social networks; Media and communication for environmental management; science communication for environmental management
- 820-534 Marketing and Branding for Environmental Management 3((3)-0-6)
 Principles of marketing, branding and brand management for environmental management; Storytelling and branding; Internationalization of brands; Consumer perception and behavior; Marketing plan; Tools for marketing and branding strategy; Brand equity
- 820-535 Module: Green Business and Design for Environment 9((4)-15-8)
 Concepts of natural system, sustainability and circular economy; concept of innovation ecosystem; sustainable supply management; feasibility analysis; intellectual property and patent; principle for product design for environment; technique and method for creativity and innovation development; customer needs survey; sustainable finance model; project management; marketing and finance
- Discipline: Environmental Innovation and Sustainability**
- 820-540 Data Science and Model for Environmental Management 3((3)-0-6)
 Introduction to data science, Data exploration, data management, data visualization, data mining and data science technique, computer programming, statistics, mathematical modelling and applications for environmental management

- 820-541 Internet of Things (IoT) in Environmental Management 3((3)-0-6)
Introduction to IoT; Concepts, standards and components of IoT; Design of IoT systems; IoT protocols; IoT applications for environmental management
- 820-542 Sustainable Innovative Water Management 3((3)-0-6)
Sustainable and innovative water management concept; urban hydrology, stormwater runoff Hydraulic processes in surface water; drainage, water pollution, water supply; sewage management; decentralized wastewater management; sustainable stormwater management, residential and community water use; reuse climate resilience of urban water infrastructure
- 820-543 Innovative Waste Management and Utilization 3((3)-0-6)
Engineering and biochemical concepts, technique, methodology and innovation in waste recovery and utilization from water, wastewater, sludge, and solid waste; waste to energy technology, waste removal and recovery for limited natural resources, their environmental benefits and impacts on human health, environment, and social, feasibility study on waste recovery and recycling
- 820-544 Innovative Wastewater Management: Treatment and Recovery 3((3)-0-6)
Basic theories and innovations regarding treatment of wastewater from various sources; physical-chemical-biological processes in sludge and wastewater treatment; standards and related regulations for wastewater treatment system and wastewater discharge including water recovery
- 820-545 Biofuel Technology 3((3)-0-6)
Greenhouse gas mitigation, biofuel life cycle, development of biofuel, potential of biomass such as agricultural residues; animal by-products and industrial waste, type of biofuels such as bioethanol; biodiesel; biomethane and biohydrogen, supply; markets of biofuel, law, economic and environmental impacts of biofuels
- 820-546 Polymers and The Environment 3((3)-0-6)
Basic principles of polymers, classification, properties and application; instrument and techniques used for physicochemical analysis of polymers; environmental impact of polymers especially plastic and rubber; environmental stability of polymers; reducing the environmental impact; the choice of approach and technology for polymer product management; environmental friendly polymers and biodegradable polymers
- 820-547 Module: Industrial Pollution Management 9((4)-15 -8)
Situation of environmental pollution; environmental laws for industrial pollution management (water, air and industrial waste); pollution reduction from source; analytical

technique for industrial pollution; industrial waste removal technology; technique for industrial pollution removal system control; ISO; risk assessment and risk management for industrial pollution

- Discipline: General

820–550 Special Topics in Environmental Management I 3((3)-0-6)
Current interests concerning natural resources and environment

820–551 Special Topics in Environmental Management II 3((3)-0-6)
Current interests concerning natural resources and environment

Thesis

820–800 Thesis 24(0-72-0)
Research in environmental management; writing reports under supervision of
thesis advisors

820–801 Thesis 36(0-108-0)
Research in environmental management; writing reports under supervision of
thesis advisors

820–802 Minor-Thesis 6(0-18-0)
Research in environmental management; writing reports under supervision of
thesis advisors
