UNDERGRADUATE COURSES

H511111 Economics (1)

Purposes of this class are to cover the basic concepts of micro-economics. The class will cover principal components of the micro-economics, including the supply & demand function, consumers and firms, market structure and firm strategy. It is hoped that students can learn the scientific observations and inferences regarding the logical decision making among constrained resources in the daily life.

H511310 Accounting (1)

This course introduces the concepts of financial accounting and its underlying assumptions. The emphasis of the class is on using accounting information in the evaluation of business performance and risk. Throughout the course we will illustrate applications of accounting principles with real examples.

H511910 Principle of transportation (1)

Principle of Transportation is designed as a one-year course, which provides a broad and in-depth introduction to transportation industries for students who first study in this field. The course in the 1st semester primarily covers the issues including overall introduction, highway, railways, and public transportation systems. Furthermore, water transportation, air transportation, pipelines, containers, logistics, transportation policies, and Intelligent Transportation Systems (ITS) will be introduced in the 2nd semester. Moreover, students are expected to read related materials in order to further exploring this field and develop their passion for transportation specialty.

H511100 Introduction to computer system (1)

This course introduces the concepts and theoretical background in several topics of Computer Science, including organizations, operation systems, computer networks and internet, programming languages and data structures, algorithms, software engineering, databases, and electronic commerce.
**H522311 Statistics (1)**

This course is to give students, primarily those in the fields of management or economics, a conceptual introduction to the field of statistics and its many applications.

**H535901 Traffic engineering**

The aims of the course of Traffic Engineering are to introduce the fundamental concepts and basic components of a traffic system, and to investigate traffic characteristics and conduct traffic studies, including traffic flow, volume, speed, and delay studies. The contents of the course include the following 4 parts: 1) traffic components and characteristics, 2) traffic survey/studies and solution preparation, 3) applications to rural and intercity highway system, and 4) applications to urban street and road system.

**H521000 Railway transportation**

This course aims to provide the expertise and understanding of the operation and management of railway system at urban and regional scales.

**H530500 Principle of management science**

The main objectives of this course are to provide the students with the basic knowledge of management and to inspire the students by realizing the power and usefulness of management.

**H534011 Operations research (1)**

Linear Programming, Simplex Method, Lindo, CPLEX

**H521200 Introduction of telecommunication management**

Telecommunications Management reviews the market conditions of Taiwan's Telecommunications Industry, and then examine its open policy and main competitive issues.

**H531900 Intelligent transportation system**

This course is designed as an introduction to the evolution of advanced technologies applying to modern transportation systems in order to enhance the global performance as well as improve traffic safety. The primary materials cover theoretical foundations,
technologies applied in ITS such as communication, location, GIS, .etc. Selected applications in nine systems in ITS will be detailed discussed.

**H520201 Transportation economics**

This course aims to provide the expertise and understanding of transportation economics applied in the scope of transportation related activity in the nation’s economy.

**H533501 Regression analysis**

Regression analysis is a statistical methodology that utilizes the relation between two or more quantitative variables so that a response or outcome variable can be predicted from the other, or others. This methodology is widely used in business, the social and behavioral sciences.

**H544801 Financial management**

Introduction to Financial statements and ratios; Time value of Money, Present Value, Future Value; Interest Rates, Valuation of Bond and Stock; Capital Budgeting; IRR and NPV; Capital Investment Decisions and Project Collection; Risk, Expected Return and Markowitz’s Portfolio Theory, Efficient Market; CAPM, SML; Capital Structure; Cost of Capital; Short-Term Financial Planning and Management Option, Real Option, Warrant and Convertible; Forward, Futures and Swap.

**H533200 Global logistics**

Globalization and international trade, Supply chain strategies, Logistics service providers, Procurement and outsourcing, Inventory management, Warehousing and materials management, Transport in supply chains, Information flows and technology, Supply chain vulnerability, risk, robustness and resilience, Integration and collaboration, Sustainable logistics and supply chain systems

**H542400 Telecommunication operations & management**

This course is the capstone of telecommunication division students to integrate previous classes in telecommunication economics, technology and service industry marketing for a big picture of this sector. Therefore, strategic management becomes the main theme to link each operations and management component for providing a theoretic model with suitable quantitative and qualitative training. In addition, the textbook, Strategic Management, offers basic strategy planning skills in strategy formulation, implementation, and evaluation as the first step. Strategic management
will be applied into telecommunication firms for comprehending the essence of competition and evolution as the next step. The two-step training enables students to compare, analyze, evaluation various telecommunication related firms’ operations and management.

**H524300 Tourism management**

The purposes of this class are to introduce students the concepts, principles and operation of the tourism industry. The class will begin with basic definition and theory of why people travel, followed with discussion on demand and supply theory of the tourism industry. Tourism impacts to the regional community will be elaborated from the environment, culture, social and economic perspectives. The second half of the class will focus on current situation and future development of tourism in Taiwan along with governmental administration framework and regulation.

**H531400 Transportation policy**

This course will cover the study content of four major transportation system policies: railway, highway, air transport and marine, involving transportation policy theories, transportation best practices, and transportation safety policy issues. This course specially focuses on several perspectives such as theoretical and practical study of domestic transportation policy, international transportation policy or strategic planning, and policy evaluation analysis model. Students will learn how to solve transportation issues by case teaching.

**H542300 Traffic flow theory**

The aims of this course are to introduce the fundamental concepts and basic components of a traffic system, and to investigate traffic characteristics and conduct traffic studies, including traffic flow, volume, speed, queue, and delay studies. The contents of the course include the following 5 parts: 1) fundamentals of traffic flow, 2) macroscopic traffic flow theorems, 3) microscopic traffic flow theorems, 4) impact and queuing models, and 5) simulation of traffic flow.

**H511121 Economics(2)**

This course introduces the principles of Economics which studies what goods and services are produced in what quantities; how, when and where goods and services are produced; and who will consume them. Economics can be divided into two major branches of the subjects: Microeconomics and Macroeconomics. Microeconomics studies the decision-making of individual people and firms, and the interaction of those decisions in markets. Macroeconomics studies the national economy and the global economy as a whole. The topics include Gross Domestic Product, Inflation, Unemployment, Aggregate Supply and Aggregate Demand, Fiscal Policy, Monetary Policy and International Trade. Last semester we had studied Microeconomics, this
semester we shall discuss the issues in Macroeconomics.

**H511920 Principle of transportation (2)**

This course introduces the second part of modern transportation to bring a comprehensive map of global transportation development and contemporary issues. The contents cover three sections. One is different transportation methods as marine, air and pipeline transportation. The other is current policy issues focused on supply chain management, policy of modern transportation development, regulations of transportation, freight control and subsidy on transportation services, and intelligence transportation system. The last section is basic telecommunication information. The teaching design provides different approaches to address each topic from commercial competition, technological evolution and policy considerations and enrich students understanding on this important course. In addition, group projects would be assigned to encourage students to apply what they learn from this course to figure out the operations of transportation and telecommunication in real world. In addition, some hot issues would be debated in this course to enrich students’ understanding of industry development and policy.

**H525801 Computer programming**

Introducing C, Formatted Input/Output, Loops, Arrays, Functions, Pointers, Program Organization, Large Programs

**H522321 Statistics (2)**

Statistics is the study of the collection, organization, analysis, interpretation and presentation of data. It deals with all aspects of this, including the planning of data collection in terms of the design of surveys and experiments. Fundamental concepts and applications of Statistics will be introduced in this class.

**H533401 Transportation engineering**

To present the concepts and methods of transportation engineering to help students reach the point, and apply to transportation related areas in research and projects.

**H520100 Business law**

This course is designed as an introduction to the enterprise law, the law of negotiable instrument, the insurance law and the maritime commercial law.

**H526100 Air transportation**

Air Traffic Rights, Aviation Laws and Regulations, Air Transport Management, Air

**H534023 Operations research(2)**

Operations Research is the application of mathematics and scientific method to determine the best operations and/or systems for real world problems across many fields. This course studies integer and nonlinear programming, game theory, stochastic (probabilistic) Markov chains and dynamic programming. A collection of mathematical tools empower students’ capabilities to deal with real world managerial problems optimally.

**H521600 Transportation safety**

To present the concepts and methods of transportation safety to help students reach the point, and apply to transportation related areas in research and projects.

**H520700 Public transportation**

This course aims to provide the expertise and understanding of the operation and management of Public transportation system.

**H520900 Introduction to communication**

Data communications and networking may be the fastest growing technologies in our culture today. One of the ramifications of that growth is a dramatic increase in the number of professions where an understanding of these technologies is essential for success, and a proportionate increase in the number and types of students taking courses to learn about them. This course is to aim students to understand the concepts and mechanisms underlying telecommunications and networking.

**H523200 International trade**

Introduction of International Trade Practice, Incoterms 2000, Letter of Credit, Shipping documentations, Invoices

**H530601 Transportation management**

Characteristics and functions of transportation industry as well as theories and features of business administration are both considered in this course, taking into account the internal and external environment factors. Transportation management
issues will be discussed with the basis of understanding theory and practice. Students will be instructed with state-of-the-art operations and management knowledge to be the transportation business leaders.

**H531000 Service industry marketing**

The objectives of this course are two: (1) to understand the fundamental concepts and skills of services marketing, (2) to learn how to apply those concepts and skills into real practice.

**H543501 Transportation planning**

To present the concepts and methods of transportation planning to help students reach the point, and apply to transportation related areas in research and projects.

**H530800 Warehousing and inventory management**

Stocks and inventories, Stocks within an organization, Economic order quantity, Models for known demand, Models for unknown demand, Sources of information, Forecasting demand, Planning and stocks, Material requirements planning, Warehouse management.

**H533800 Information communication technologies and law**

Development in recent information and communication technologies (ICT) has transformed our communications pattern and daily life. It brings about new types of businesses and new way of living, which also creates new legal issues that never been dealt with. This course introduces current ICT development with focuses on cases evolving from the application of ICT. Relevant legal issues are to be discussed and main topics include internet and law, cyber security, privacy protection, ICT and intellectual property right, digital convergence policy, and competition law related issues. It aims to provide basic legal knowledge in our digital era and arouse research interest for further study.

**H535800 Data base**

This course presents the fundamental concepts of database management system (DBMS). It provides a study of entity relationship data model (ER-model), data description languages, and query facilities including structural query language (SQL),
data normalization, transactions and their properties, data organization and indexing, security issues and database system administration issues. It also looks at the new trends in databases. The knowledge of the above topics will be applied in the design and implementation of a database application. Each student will be asked to experience how to build a database application.

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GRADUATE COURSES

**R555800 Special topics on transportation systems**

For the students to understand the dynamic fields of transportation by providing them with a solid background and history of transportation that emphasizes the fundamental role and importance the industry plays in our society.

**R510400 Statistical method**

To present the concepts and methods of statistics to help students reach the point of being able to carry out effective modeling, analysis, and projects.

**R560800 Communication network**

This course enables the graduate students, concentrating on telecommunication management, to analyze, design and evaluate communication network system based on business oriented perspective. Therefore, the content covers the engineering oriented approach to figure out a communication network from fundamentals, transmission technologies, and routing protocols theoretically and business oriented probing into network administration, design, development and management. In addition, some latest communication technologies, next generation network (NGN) RFID, WiMAX, LTE, will be addressed in the course with well designed hand-on
activities and useful labs to enrich students’ exposure on the evolution of telecommunication technology.

**R576200 Transportation network equilibrium models**

One of the major tasks of transportation engineers and urban planners is determining the flow pattern of given transportation scenarios. In this course, we will study how individuals travel through an urban transportation network, analyze the equilibrium phenomenon and predict the resulting flow pattern. We intend to cover the following equilibrium related topics: shortest path, analysis of urban transportation networks, formulation of assignment problem, user equilibrium and stochastic user equilibrium. Basic mathematical programming concepts and coding ability are required for taking this course.

**R555100 Telecommunications industrial organization**

Telecommunications Industry Analysis focuses its analytical structure on more realistic oligopoly and monopolistic competition. The contents of this course can be divided into four parts. (1) We first introduce Industrial Organization and its analytical structure, and Telecommunications Economics. We also review the market conditions of Taiwan and China’s Telecommunications Industry, and then examine its open policy and main competitive issues. (2) Marketing and pricing strategies of Telecommunications industry are studied. (3) Business management and policy’s cost/benefit analysis of Telecommunications industry are studied. (4) Students’ semester reports of telecommunications related literature are discussed in the end.

**R577800 Multivariate analysis**

Introducing concepts and analytical skills of multivariate data analysis.

**R561300 Foreign exchange**

International Monetary System; Foreign Exchange Market: Spot Market; Foreign Exchange Market: Forward Market; Foreign Exchange Market: Swap Market; Foreign Exchange Market: Futures and Options; Foreign Exchange Market in London, NY, Tokyo, and Frankfurt; European Climate Exchange Market.

**R556000 Fleet planning**

Market Analysis, Airplane Analysis, Schedule Analysis, Economic Analysis, Financial Analysis
R553900 System simulation

This course introduces the application and theoretical background of systems simulation. Topics included modeling systems dynamics using discrete events, the modeling of Transportation applications and service systems through simulation. A high-level simulation package ARENA will be utilized for complex simulation problems.

R570900 Bus operations management

Bus service is one of the ground public transportation systems. Due to the intensive roadway networks in most countries, bus service is indeed invincible of everyday life. Nevertheless, local and intercity bus services are facing strong competition of rail and air transportation services. Bus passengers desire diverse and better service quality than ever. All these matters have put significant pressures on bus operators to make improvements. Theoretical background and practical perspectives of bus operations will be both instructed in this course to facilitate better understanding of bus service business.

R564100 Mathematical programming

Mathematical programming (MP) is a scientific approach to decision making that seeks best design and operate a system, usually under conditions requiring the allocation of scarce resources. This course is designed to provide masters students in the Graduate Institute of Transportation and Communication Management Science an overview of the major topics in MP. The course emphasizes model-formulation and model-building skills as well as the interpretation of software output.

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R555400 Airline management

The course content is divided into 3 parts: firstly, introduction to development of airline industry. Besides, an introduction will also be made respectively on 7 major
airline management issues: airline scheduling, operation planning, revenue management, maintenance management, fleet planning, marketing, financial management, and service quality management. Finally, international air transportation, airline strategic alliances, air cargo, and air transport policy will be also discussed.

**R554600 Risk management**

1. The Institute of International Management is dedicated to providing a quality teaching and research environment to provide students with a broad, integrated knowledge of management in preparation for successful careers in business, government or academia.
2. This mission of the Master’s program at the Department of Transportation, Communication and Management Science is to incubate innovative professionals with global mind in ubiquitous services.

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**R556900 Research methods**

To present the concepts and methods of statistics to help students reach the point of being able to carry out effective modeling, analysis, and projects.

**R562200 Practice and applications of transportation planning**

This course is an introduction to urban transportation planning for master's students in Transportation, but may be of interest to students from other programs as well. The course takes a critical look at the state of transportation planning today, focusing on current policies and planning methodologies, unresolved problems and unmet needs in transportation, and alternative policy directions for the future.

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**R557000 global logistics**

This course will cover the topics that encompass the planning and management of activities involved in global logistics management. All of the relevant issues are thoroughly explained, including documentation, terms of payment, term of trade, exchange rate exposure, international insurance, customs clearance, agency and distributor sales contracts, packaging, transportation and security issues. The coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party logistics and customers will also be discussed so that students can be prepared for the managerial roles in the future.

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**R557800 Competition and fair trade law**

This course introduces the basic concept of competition law and practice, with Taiwan Fair Trade Law being the main focus. Specific competition issues, such as Monopoly and Dominance, Significant Market Power (SMP), Cartel, Merger, and Unfair Competition etc., are to be reviewed on a case study base. Relationship between fair trade law (competition law) and other laws will be discussed as well. The course aims to provide a general concept of Fair Trade Law and competition policy, for further research in industry management and regulatory review.

**R561200 Transportation engineering and technologies**

The aims of this course are to introduce the fundamental concepts and basic components of a transportation system, and to investigate the major areas of transportation engineering, planning, and management. Besides, fundamental concepts concerning intelligent transportation systems (ITS) will be covered and illustrated. The contents of the course include the following 4 parts: 1) transportation components and characteristics, 2) highway characteristics and studies, 3) characteristics and planning of other modes, and 4) fundamentals of ITS.
**R571500 International economics and finance**
Financial Crisis; Federal aid and Economics Indicators; Mutual Fund; World Economic; Personal Finance; Application to shipping, carbon and financial market

**R551400 Civil aviation laws and regulation**
Civil Aviation Act, Regulation of Civil Air Transport Enterprise, Aircraft Flight Operation Regulation

**R571100 Supply chain optimization**
Supply Chain Management (SCM) concerns organizational aspects of integrating legally separated firms as well as coordinating material and information flows within a production-distribution network. That is, SCM are concerned with the efficient integration of suppliers, factories, warehouses and stores so that products are distributed to customers in the right quantity and at the right time. The course studies models that explore the key issues associated with the management of supply chain. A special attention will be given to integration of supply chain decisions and consequential difficulties. A considerable portion of the course is devoted to models that treat uncertainty explicitly.

**R560900 Special topics on intelligent transport systems**
This course aims to introduce special topics in Intelligent Transportation Systems and telematics systems. We will discuss the special issues of the sub-systems in ITS with emphasis on design concepts, ideas, consideration, implementation details, and system workflows. Several real ITS system or trial projects on each sub-system in ITS will be introduced in detail. Technical and institutional issues associated with implementation of ITS or telematics applications will be discussed.

**R571000 Railway operations management**
This course introduces some essential management techniques in railway operation such as safety management, yield management, scheduling, etc. In addition, the instructor also organizes some field trips in the local railway organization.

**R951400 Theore and application of wireless communications**
Today's marketplace is driving companies toward an Adaptive IT orientation and
motivating an evolution from the wired to the wireless world. Perhaps your
competitive edge can best be improved by further streamlining your logistics and
distribution processes through new wireless applications and technology. The answers
regarding where to start and where to go are clearly unique to your business. This
course aspires to assist you in considering an effective entry point into the wireless
world, and to envision a sustainable road map for evolving your mobile business
applications architecture.

**R552700 Transportation network analysis**

Network flows is a classical research field with a wide-range of applicability, such as
chemistry, physics, computer networking, manufacturing, engineering and
transportation. In this course, we will study how to formulate transportation problems
as network flow problems and analyze the algorithms designed to solve these
problems efficiently. We intent to cover the following network related topics: shortest
path, maximum flows, minimum cost flows, minimum spanning trees and
multicommodity flows. Basic mathematical programming concepts and coding ability
are required for taking this course. General Program.

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multicommodity flows. Basic mathematical programming concepts and coding ability
are required for taking this course. General Program

**R553600 Artificial neural networks**

This course is designed as an introduction to graduate students with diverse interests.
The primary materials cover theoretical foundations, network architectures, learning
algorithms, performance analysis and a variety of applications. Lectures will be given
to introduce relevant background. One or more articles will be distributed and
assigned to each individual student who is required to present the contents in class.
All students are required to turn in review comments on those papers and participate
in class discussions. A term project is required for each student in this class.

**R550300 Transportation economics**
Reviewing fundamental economics concepts and introducing their applications in transportation industry

**R560400 Windows programming**
This course is to teach the basic principles of programming and the basic constructs of the C++ language in the windows environment. The coding techniques that make programs more readable and often more efficient will also be included. Throughout the course, students can solve problems using the C++ language.

**R571400 Advanced traffic management and control**
This course is an advanced course for traffic management and control. Main focus of the course is to introduce concepts and advanced methodologies for the design of control strategies for transportation systems operations, including signalized street networks and highway traffic systems, transit systems and Intelligent Transportation Systems. One important purpose is to bridge the gap between the theory and the real world of traffic control. Most traffic engineers are trained to interpret formulas as something in which one substitutes numbers. However, a formula should be a “short hand” notation which describes a cause and effect relation among physical observables. Formulas are just part of the text which tries to explain something. Relevant advances in traffic flow analysis and traffic operations are also discussed and interfaced where appropriate.

**R557700 International economics and finance**
This course is designed to provide master’s students in the Graduate Institute of Transportation and Communication Management Science a solid grounding in the international economics and international finance