審査意見への対応を記載した書類（１０月）

（目次）先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（M）

（改善事項）先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（M）

１．本専攻では、「SDGs 達成に向けた地域と世界の喫緊の課題」を「学際的な視点や多元的なアプローチで研究や実務を遂行できる能力を有し」た人材を養成するとしており、先進理工系科学研究科の国際連携専攻でも専攻分野や研究手法が違うものの、同様な人材を養成することとしており、３つのポリシーも類似している。学際的な視点や多元的なアプローチで研究や実務を遂行できる能力を有し、類似した養成する人材像やディプロマ・ポリシーで２専攻を設置するのであれば、両専攻が協力して教育を行うことでより高い教育効果を上げられると考えられる。本学における両国際連携専攻の位置付けや設置の趣旨を明確にし、それぞれの研究科の教育内容を深化させていくことに重点を置いているのか、あるいは連携して学際的な視点を養っていくのかを説明すること。

（対応）

両国際連携専攻の位置づけや設置の趣旨を，より明確にします。

SDGs 達成のために即戦力となる人材育成のためには，大きく２つの手法，すなわち，社会科学的アプローチと理工学的アプローチが存在します。本専攻においては，母体となる専攻と連携外国大学の教育資源を最大限に活用できる理工学的アプローチを採用します。すなわち，持続可能な開発学領域において，エネルギー工学や資源管理分野に特化したプログラムを提供しているライプツィヒ大学と，環境学や都市工学分野に特化した授業科目を提供している広島大学が，連携して１つの教育課程を構築し，双方の教員が協働して研究指導を行うことにより，上述の人材育成を行います。そのため，アドミッション・ポリシーにおいても，「エネルギー工学，資源管理工学，環境学や都市工学を基盤に」，「複雑プロセスを分析，評価する意欲を持つ人」を求めています。同じように，カリキュラム・ポリシーでは，「環境的に持続可能な発展を実現するために必要な技術」等を専門科目として学ばせます。同様に，ディプロマ・ポリシーにおいても，「エネルギー工学，資源管理工学，環境学や都市工学を基盤」にした研究・実践能力を身に付けさせます。

以上のとおり，本専攻は，理工学的アプローチにより SDGs の達成を成し遂げる人材を育成するための専攻であり，社会科学的アプローチにより SDGs の達成を成し遂げる人材を育成する「人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻」（申請中）とは，その設置の趣旨が異なるものです。

その上で，本専攻の学生と「人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻」（申請中）の学生が広島大学で共に学ぶ機会があることを活かし（広島大学開講の Integration 科目は両専攻で共通に開講），一層の学際的視野の養成にも配慮します。すなわち，応用と実践力の養成を目的とした Integration 科目において，社会科学系の学生と理工学系の学生が同じ教室で学ぶことにより，相互に異なった視野や考え方に接することができ，社会科学系や理工学系といった枠に収まらない高度の学際性を養います。

（新旧対照表）　設置の趣旨等を記載した書類　１頁－２頁

新	旧
Ⅰ　設置の趣旨及び必要性 **１．背景・社会的要請** **(2) 持続可能な開発の学問分野** （略） これに対して開発学は，経済や社会の開発を中心的な課題とする学際研究領域であり，経済学，政治学，法学，社会学，教育学，文化人類学，医学・保健学，土木・建築工学，農学などの関連学問分野を含む。開発学の対象とする国や地域は，もっぱら最貧国や開発途上国であるが，先進国が途上国の開発を支援するという援助からパートナーシップによる相互協力・協働を原則とする国際協力へとアプローチが変遷してきた。本申請で提案する学問分野「持続可能な開発学（サステイナビリティ学）」は，上記の環境学における従来の持続可能な開発論に，開発学における国際協力論を統合し，持続可能な開発目標 SDGs の実現を目指す応用学際領域であると定義する。 本専攻では，上述の「持続可能な開発学」の中でも特に，環境的に持続可能な開発（環境持続可能性）にかかる課題解決のための技術や自然科学を扱う理工学的アプローチによる計画，開発，実装，分析，評価について学際的・国際的な視点で学ぶことを特徴としている。	**Ⅰ　設置の趣旨及び必要性** **１．背景・社会的要請** **(2) 持続可能な開発の学問分野** （略） これに対して開発学は，経済や社会の開発を中心的な課題とする学際研究領域であり，経済学，政治学，法学，社会学，教育学，文化人類学，医学・保健学，土木・建築工学，農学などの関連学問分野を含む。開発学の対象とする国や地域は，もっぱら最貧国や開発途上国であるが，先進国が途上国の開発を支援するという援助からパートナーシップによる相互協力・協働を原則とする国際協力へとアプローチが変遷してきた。本申請で提案する学問分野「持続可能な開発学」は，上記の環境学における従来の持続可能な開発論に，開発学における国際協力論を統合し，持続可能な開発目標 SDGs の実現を目指す応用学際領域であると定義する。

（新旧対照表）　設置の趣旨等を記載した書類　３頁

新	旧
Ⅰ　設置の趣旨及び必要性	**Ⅰ　設置の趣旨及び必要性**

２．設置の必要性 （1）SDGs 達成を担う人材育成の必要性 （略） さらに，SDGs は前述の通り，環境学の研究領域であった「持続可能な開発」と開発学の融合である。そして，途上国における開発研究のみならず先進国における持続可能な開発のあり方も整合的な同じ枠組みの中で考えなければならない。こうした教育研究領域の飛躍的な拡大に対して，学際研究領域を広くカバーする総合研究大学は，高度な人材育成の分野で貢献することが求められる。とりわけ，新たな社会的動向やニーズの変化を感知し，柔軟に提供すべきプログラムを開発することが期待される大学院において，SDGs 目標達成のために即戦力となる人材育成のための新たな学位プログラムの設置が急務となっている。 このような人材を育成するに当たっては，社会科学的アプローチと理工学的アプローチが存在するが，本専攻においては，母体となる専攻と連携外国大学の教育資源を最大限に活用できる理工学的アプローチを採用する。すなわち，理工系科学の学問領域の中で「サステイナビリティ学」は，途上国と先進国の双方において低炭素社会，循環型社会，自然共生社会を実現するための環境的に持続可能な開発（環境持続可能性）に関連する諸技術を融合した学問と位置づけられる。具体的に，本専攻では，広島大学とライプツィヒ大学の特長を生かし，環境学，都市工学，エネルギー工学，資源管理学などのテーマに重点を置いて，新しいタイプの理工学分野の高度専門人材を養成する。	２．設置の必要性 （1）SDGs 達成を担う人材育成の必要性 （略） さらに，SDGs は前述の通り，環境学の研究領域であった「持続可能な開発」と開発学の融合である。そして，途上国における開発研究のみならず先進国における持続可能な開発のあり方も整合的な同じ枠組みの中で考えなければならない。こうした教育研究領域の飛躍的な拡大に対して，学際研究領域を広くカバーする総合研究大学は，高度な人材育成の分野で貢献することが求められる。とりわけ，新たな社会的動向やニーズの変化を感知し，柔軟に提供すべきプログラムを開発することが期待される大学院において，SDGs 目標達成のために即戦力となる人材育成のための新たな学位プログラムの設置が急務となっている。

（新旧対照表）　設置の趣旨等を記載した書類　１０頁－１１頁

新	旧
Ⅱ　本国際連携専攻の特色 本専攻の特徴は，環境的に持続可能な開発（環境持続可能性）にかかる課題解決のための技術や自然科学を扱う理工学的アプローチによる計画，開発，実装，分析，評価について学際的・国際的な視点で学び，研究や実務に応用できる能力を育てることにある。学生は自ら取り組む課題を設定し，その課題解決に向けて主体的に学修を進める。１．(2)で定義した「持続可能な開発学」は広範な学際研究領域であるが，その領域において最も関連の深い分野は，広島大学は環境学や都市工学分野であり，ライプツィヒ大学は持続可能な開発におけるエネルギー工学や資源管理分野である。本専攻は，その両大学が，持続可能な開発に関する主要な自然科学分野を統合した 1 つの国際連携教育課程を構築するものである。広島大学は，アジアを中心としたフィールドで実践的な教育研究を行ってきており，その経験の蓄積やネットワークを活かすことが可能である。欧州とアジアという地球規模での持続可能な開発において主要なリーダーシップを発揮する 2 地域のそれぞれの地域特性を理解しながら，互いの大学の経験を活かし，良質な授業科目を提供する。また，特徴が異なる両大学の教員が協働して指導を行うことにより，より学際的な視点が必要とされる持続可能な開発に関する修士論文の指導が可能となる。 このように，本専攻では，環境学を基礎としつつ SDGs の達成に資する人材を育成するものであり，アドミッション・ポリシーに	**Ⅱ　本国際連携専攻の特色** 本専攻の特徴は，途上国の急激な都市化に伴う環境問題を中心とした課題解決のための技術の計画，開発，実装，分析，評価について学際的・国際的な視点で学び，研究や実務に応用できる能力を育てることにある。学生は自ら取り組む課題を設定し，その課題解決に向けて主体的に学修を進める。１．(2)で定義した「持続可能な開発学」は広範な学際研究領域であるが，その領域において最も関連の深い分野は，広島大学は環境学や都市工学分野であり，ライプツィヒ大学は持続可能な開発におけるエネルギー工学や資源管理分野である。本専攻は，その両大学が，持続可能な開発に関する主要な自然科学分野を統合した 1 つの国際連携教育課程を構築するものである。広島大学は，アジアを中心としたフィールドで実践的な教育研究を行ってきており，その経験の蓄積やネットワークを活かすことが可能である。欧州とアジアという地球規模での持続可能な開発において主要なリーダーシップを発揮する 2 地域のそれぞれの地域特性を理解しながら，互いの大学の経験を活かし，良質な授業科目を提供する。また，特徴が異なる両大学の教員が協働して指導を行うことにより，より学際的な視点が必要とされる持続可能な開発に関する修士論文の指導が可能となる。

おいても，「エネルギー工学，資源管理工学，環境学や都市工学を基盤に」，「複雑プロセスを分析，評価する意欲を持つ人」を求めている。同じように，カリキュラム・ポリシーでも，「エネルギー工学，資源管理工学，環境学や都市工学を基盤に」することとしている。同様に，ディプロマ・ポリシーにおいても，「エネルギー工学，資源管理工学，環境学や都市工学を基盤」にした研究・実践能力を身に付けることとしており，本専攻は理工学的アプローチによる SDGs の達成を成し遂げるための専攻である。	

（新旧対照表）　設置の趣旨等を記載した書類　２５頁

新	旧
Ⅵ　教育方法，履修指導方法，研究指導体制及び修了要件 **２．指導体制** **(2) 指導方法** （略） また，SDGs 達成に向けた研究力や実務能力を育成するため，持続可能な発展論に関する主要な議論とその背景となる考え方を包括的に教え，多様な観点から持続可能な発展を論じる基盤を習得させる。そして，政府開発援助の主要なスキームを取り上げ，プロジェクトの実践的な管理方法や事業評価について指導する。 さらに，本専攻の学生と「人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻」（申請中）の学生が広島大学で共に学ぶ機会があることを活かし（広島大学開講の Integration 科目は両専攻で共通に開講），一層の学際的視野の養成にも配慮する。すなわち，応用と実践力の養成	**Ⅵ　教育方法，履修指導方法，研究指導体制及び修了要件** **２．指導体制** **(2) 指導方法** （略） また，SDGs 達成に向けた研究力や実務能力を育成するため，持続可能な発展論に関する主要な議論とその背景となる考え方を包括的に教え，多様な観点から持続可能な発展を論じる基盤を習得させる。そして，政府開発援助の主要なスキームを取り上げ，プロジェクトの実践的な管理方法や事業評価について指導する。

を目的としたIntegration科目において，社会科学系の学生と理工学系の学生が同じ教室で学ぶことにより，相互に異なった視野や考え方に接することができ，社会科学系や理工学系といった枠に収まらない高度の学際性を養う。	

（改善事項）先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（M）

２．本専攻においては全ての授業科目を英語で行う計画であるが、シラバスの教科書や参考書には日本語のものも含まれており、実際に英語で授業が行えるのか不明確である。英語で授業が適切に行われることを改めて説明すること。

（対応）

本専攻のベーシック科目については，各ホーム大学で履修することから，本学をホーム大学とする日本語を解する学生に，学修目的に応じて一部日本語開講科目を履修させても教育課程上支障が無いと判断し，選択科目として含めていました。

しかし，全ての授業科目を英語で行うという本専攻設置の趣旨から，対象の科目は自由科目に変更します。

なお，専門科目（Specialization 科目），専門科目(Integration 科目）及び研究指導については，母体となる専攻の，英語でも修了が可能な学位プログラムにおいて，英語で授業を実施する教員が担当するため，これらの科目は英語で実施されます。

（新旧対照表）　教育課程等の概要　１－２頁

新

科目区分				授業科目の名称	(略)	単位数 必修	選択	自由
ベーシック科目	広島大学開設科目	大学院共通科目	持続可能な発展科目	(略)	(略)	(略)		
				SDGs への学問的アプローチ A	(略)			1
				SDGs への学問的アプローチ B				1
				(略)		(略)		
			(略)					
				小計(13 科目)	(略)	0	14	2
		(略)						
	(略)							
(略)								
合計(68 科目)					(略)	0	185	2

旧

科目区分				授業科目の名称	(略)	単位数 必修	選択	自由
ベーシック科目	広島大学開設科目	大学院共通科目	持続可能な発展科目	(略)	(略)	(略)		
				SDGs への学問的アプローチ A	(略)		1	
				SDGs への学問的アプローチ B			1	
				(略)		(略)		
			(略)					
				小計(13 科目)	(略)	0	16	0
		(略)						
	(略)							
(略)								
合計(68 科目)					(略)	0	187	0

（新旧対照表）　教育課程等の概要　４－５頁

新

科目区分				授業科目の名称	(略)	単位数 必修	選択	自由
ベーシック科目	広島大学開設科目	大学院共通科目	持続可能な発展科目	(略)	(略)	(略)		
				SDGs への学問的アプローチ A	(略)			1
				SDGs への学問的アプローチ B				1
				(略)		(略)		
			(略)					
			小計(13 科目)		(略)	0	14	2
		(略)						
	(略)							
(略)								
合計(52 科目)					(略)	0	100	2

旧

科目区分				授業科目の名称	(略)	単位数 必修	選択	自由
ベーシック科目	広島大学開設科目	大学院共通科目	持続可能な発展科目	(略)	(略)	(略)		
				SDGs への学問的アプローチ A	(略)		1	
				SDGs への学問的アプローチ B			1	
				(略)		(略)		
			(略)					
			小計(13 科目)		(略)	0	16	0
		(略)						
	(略)							
(略)								
合計(52 科目)					(略)	0	102	0

（新旧対照表）　設置の趣旨等を記載した書類　１５頁

新	旧
Ⅳ　教育課程の編成の考え方及び特色	**Ⅳ　教育課程の編成の考え方及び特色**
１．教育課程の編成の考え方及び特色	**１．教育課程の編成の考え方及び特色**
(3) 科目区分	**(3) 科目区分**
各科目区分の科目構成は以下のとおりであり，ベーシック科目の一部を除き選択科目として開設する。	各科目区分の科目構成は以下のとおりであり，全て選択科目として開設する。
①　ベーシック科目	①　ベーシック科目
＜広島大学開設科目＞	＜広島大学開設科目＞
・持続可能な発展に関する学際的な思考を育み，多様な視点から自らが内発的に成長する持続可能な発展を探求する基礎を身に付けるため，大学院共通科目（持続可能な発展科目）として「Hiroshima から	・持続可能な発展に関する学際的な思考を育み，多様な視点から自らが内発的に成長する持続可能な発展を探求する基礎を身に付けるため，大学院共通科目（持続可能な発展科目）として「Hiroshima から世界平和を考える」「Japanese

ら世界平和を考える」「Japanese Experience of Social Development-Economy, Infrastructure, and Peace」「Japanese Experience of Human Development-Culture, Education, and Health」「ダイバーシティの理解」を開設する。なお，日本語で開講する授業科目であるものの，本専攻に関連する授業科目として，「SDGs への学問的アプローチ A」及び「SDGs への学問的アプローチ B」を自由科目として開設する。	Experience of Social Development-Economy, Infrastructure, and Peace」「Japanese Experience of Human Development-Culture, Education, and Health」「SDGs への学問的アプローチ A」「SDGs への学問的アプローチ B」「ダイバーシティの理解」を開設する。

（新旧対照表）　設置の趣旨等を記載した書類　１７頁－１８頁

新	旧
Ⅳ　教育課程の編成の考え方及び特色 **１．教育課程の編成の考え方及び特色** **(3) 科目区分** **（略）** また，本専攻のディプロマ・ポリシーに示す能力と教育課程等の対応は，以下の表 1「各科目で養成する能力について」を参照。なお，（※）は自由科目であることを示す。 【表 1】各科目で養成する能力について 科目名 SDGs への学問的アプローチ A（※） SDGs への学問的アプローチ B（※）	**Ⅳ　教育課程の編成の考え方及び特色** **１．教育課程の編成の考え方及び特色** **(3) 科目区分** **（略）** また，本専攻のディプロマ・ポリシーに示す能力と教育課程等の対応は，以下の表 1「各科目で養成する能力について」を参照。 【表 1】各科目で養成する能力について 科目名 SDGs への学問的アプローチ A SDGs への学問的アプローチ B

（新旧対照表）　設置の趣旨等を記載した書類　２４頁

新	旧
Ⅵ　教育方法，履修指導方法，研究指導体制及び修了要件 **１．授業で使用する共通言語** 本専攻は，国際的に活躍する人材を養成す	**Ⅵ　教育方法，履修指導方法，研究指導体制及び修了要件** **１．授業で使用する共通言語** 本専攻は，国際的に活躍する人材を養成す

るものであり，授業では英語を使用する。（ただし，日本語による自由科目も一部開設する。）	るものであり，授業では英語を使用する。（母体となる専攻で英語開講科目という限定をしていない科目については，日本語の授業とは別途に英語の授業を開講する。）

（是正事項）先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（M）

３．３つのポリシーや養成する人材像で掲げている専門分野は、理工学専攻というには狭い専門分野であり、教育課程を適切に表した専攻名称とは言えない。また、英語名称についても人間社会科学研究科の国際連携専攻の名称と同様な名称になっており学生に誤解を与える可能性があるため、適切な名称に改めること。その際に、日本語名称と英語名称の整合性の取れた専攻名称とすること。

（対応）

本専攻は，「持続可能な開発学（サステイナビリティ学）」の教育研究を行うものであり，教育課程をより適切に表するため，専攻名称を「先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻」（英語の専攻名称は，Joint International Master's Programme in Sustainable Development (Hiroshima University and Leipzig University)）とします。

「サステイナビリティ学」とは，細分化された個々の学問領域では解決できない地球的課題に対し，人文社会科学や自然科学といった境界を越えた俯瞰的な観点から取り組むための学問です。歴史的には，２１世紀に入り世界では，地球温暖化，生物多様性の減少，貧困問題などの地球規模課題が顕著となったことにより，「サステイナビリティ学」の重要性が国際的に広く認識されるようになりました。

「サステイナビリティ学」を通じた地球規模課題の解決には，教育を通じた人材育成が不可欠であり，世界各国，特に先進国において，「サステイナビリティ学」に関する教育研究組織等が設立されています。一例は以下のとおりです。

○世界的に見た「サステイナビリティ学」に関する教育研究組織等

（米国）

・アリゾナ州立大学サステイナビリティ学研究科
・オハイオ州立大学サステイナビリティ学研究所
・コーネル大学コーネル・アトキンソン・サステイナビリティ学センター
・ペンシルバニア州立大学サステイナビリティ学研究所
・ミシガン大学グラハム・サステイナビリティ学研究所
・カリフォルニア州立大学ノースリッジ校サステイナビリティ学研究所
・メイン大学サステイナビリティ・ソリューション・センター
・ファーマン大学サステイナビリティ学センター

（欧州等）

・ヘルシンキ大学ヘルシンキサステイナビリティ学研究所
・コペンハーゲン大学サステイナビリティ学センター
・ケンブリッジ大学サステイナビリティ・リーダーシップ研究所

・国連大学サステイナビリティ高等研究所

日本国内においては，例えば，東京大学では，平成 17 年に「サステイナビリティ学連携研究機構」を設置しており，平成 22 年には一般社団法人サステイナビリティ・サイエンス・コンソーシアムが設立されています。その後，平成 23 年には博士課程教育リーデングプログラム「サステイナビリティ学グローバルリーダー養成大学院プログラム」が採択されています。

また，「サステイナビリティ学」が世界的に広く通用していることの根拠として，以下のことが挙げられます。

○国際サステイナビリティ学会（International Society for Sustainability Science (ISSS)）の発足（2012 年 2 月，アリゾナ州での第 3 回サステイナビリティ学国際会議にて）

○国際学術誌「サステイナビリティ・サイエンス」の刊行（2007 年，シュプリンガー社）
（サステイナビリティ学の論文数は，2013 年現在，約 7,000 本（東京大学　武内和彦教授（当時）の発表資料による。））

このように，「サステイナビリティ学」という用語を名称に用いた大学等の教育研究組織は世界的に多く存在しており，「サステイナビリティ学」に関する国際学会や国際学術雑誌も存在しています。各教育研究組織においては，それぞれに強みのあるアプローチが採用されていますが，「サステイナビリティ学」という共通の名称が広く使用されているのが，世界的な状況です。「サステイナビリティ学」は，その出所からして本質的に極めて学際的な学問であり，特定の分野を示す語を付加した，例えば，「○○系サステイナビリティ学」といった名称が使用されることはなく，共通して「サステイナビリティ学」を使用することが世界的な潮流となっています。

なお，「サステイナビリティ学」は，本質的に極めて学際的な学問であるため，別途申請中の人間社会科学研究科でのグラーツ大学との国際連携専攻も同様に，「人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻」（英語の専攻名称は，Joint International Master’s Programme in Sustainable Development (Hiroshima University and University of Graz)）の名称を使用します。

また，「サステイナビリティ学」のアプローチには様々なものがあることから，審査意見１への対応でも言及しましたとおり，今回申請している２つの専攻は，一部の教育課程で相互に連携して教育効果を高めます。

通常，研究科と専攻は合わせて認識されるものであり，また，教育課程の専門科目にお

ける「Environmental Management」「Development Technology」「Transportation Engineering」等の科目編成からも，本専攻は理工学的アプローチによる「サステイナビリティ学」の専攻であると認識されるものと考えます。

なお，両専攻の教育課程は，ベーシック科目では専門性にとらわれない幅広い科目を学び，Specialization 科目では各自の専門性を深め，Integration 科目では社会科学系，理工学系の枠を超えた学際性を身に付ける構造です。

（新旧対照表）　基本計画書　１頁

新		旧	
新設学部等の概要	新設学部等の名称 先進理工系科学研究科 [Graduate School of Advanced Science and Engineering] 広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻 [Joint International Master's Programme in Sustainable Development (Hiroshima University and Leipzig University)] 計	新設学部等の概要	新設学部等の名称 先進理工系科学研究科 [Graduate School of Advanced Science and Engineering] 広島大学・ライプツィヒ大学国際連携理工学専攻 [Joint International Master's Programme in Sustainable Development (Hiroshima University and Leipzig University)] 計

（新旧対照表）　基本計画書　２頁

新		旧	
同一設置者内における変更状況（定員の移行、名称の変更等）	（略） （令和元年８月意見伺い） 大学院人間社会科学研究科 広島大学・グラーツ大学国際連携サステイナビリティ学専攻（M2）	同一設置者内における変更状況（定員の移行、名称の変更等）	（略） （令和元年８月意見伺い） 大学院人間社会科学研究科 広島大学・グラーツ大学国際連携社会科学専攻（M2）

（新旧対照表）　基本計画書　２頁

新		旧	
教育課程	新設学部等の名称 先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻	教育課程	新設学部等の名称 先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻

（新旧対照表）　基本計画書　２頁

新

教員組織の概要	学部等の名称		（略）	（略）
	新設分	先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程）	（略）	所属：先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻
		計	（略）	
	既設分	（略）	（略）	
		人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻（修士課程）	（略）	
		（略）	（略）	
		計	（略）	
	合計		（略）	

旧

教員組織の概要	学部等の名称		（略）	（略）
	新設分	先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻（修士課程）	（略）	所属：先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻
		計	（略）	
	既設分	（略）	（略）	
		人間社会科学研究科広島大学・グラーツ大学国際連携社会科学専攻（修士課程）	（略）	
		（略）	（略）	
		計	（略）	
	合計		（略）	

（新旧対照表）　基本計画書　３頁

新

専任教員研究室	新設学部等の名称
	先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻

旧

専任教員研究室	新設学部等の名称
	先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻

（新旧対照表）　基本計画書　３頁

新

図書・設備	新設学部等の名称
	先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻
	計

旧

図書・設備	新設学部等の名称
	先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻
	計

（新旧対照表）　基本計画書　１８頁

新	旧
（略） 人間社会科学研究科 （略） 広島大学･グラーツ大学国際連携サステイナビリティ学専攻(M) 先進理工系科学研究科 （略） 広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（M） （略）	（略） 人間社会科学研究科 （略） 広島大学・グラーツ大学国際連携社会科学専攻（M） 先進理工系科学研究科 （略） 広島大学・ライプツィヒ大学国際連携理工学専攻（M） （略）

（新旧対照表）　教育課程等の概要　１頁

新	旧
教育課程等の概要（国際連携学科等） （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））	教育課程等の概要（国際連携学科等） （先進理工系科学研究科　広島大学･ライプツィヒ大学国際連携理工学専攻（修士課程））

（新旧対照表）　教育課程等の概要　４頁

新	旧
教育課程等の概要（国際連携学科等） （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（広島大学）	教育課程等の概要（国際連携学科等） （先進理工系科学研究科　広島大学･ライプツィヒ大学国際連携理工学専攻（修士課程））（広島大学）

（新旧対照表）　教育課程等の概要　７頁

新	旧
教育課程等の概要（国際連携学科等） （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（ライプツィヒ大学）	教育課程等の概要（国際連携学科等） （先進理工系科学研究科　広島大学･ライプツィヒ大学国際連携理工学専攻（修士課程））（ライプツィヒ大学）

（新旧対照表）　授業科目の概要　１頁

新	旧
授業科目の概要 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））	授業科目の概要 （先進理工系科学研究科　広島大学･ライプツィヒ大学国際連携理工学専攻（修士課程））

（新旧対照表）　授業科目の概要　２１頁

新	旧
授業科目の概要 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（広島大学）	授業科目の概要 （先進理工系科学研究科　広島大学･ライプツィヒ大学国際連携理工学専攻（修士課程））（広島大学）

（新旧対照表）　授業科目の概要　３７頁

新	旧
授業科目の概要 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（ライプツィヒ大学）	授業科目の概要 （先進理工系科学研究科　広島大学･ライプツィヒ大学国際連携理工学専攻（修士課程））（ライプツィヒ大学）

（新旧対照表）　シラバス　目次

新	旧
先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻　シラバス　目次	先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携理工学専攻　シラバス　目次

（新旧対照表）　校地校舎等の図面　４頁

新	旧
・・・先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻使用部分（学部・研究科共用）	・・・先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻使用部分（学部・研究科共用）

（新旧対照表）　校地校舎等の図面　５頁

新	旧
・・・先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻使用部分（学部・研究科共用） ・・・先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻使用部分（工学部・先進理工系科学研究科と共用）	・・・先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻使用部分（学部・研究科共用） ・・・先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻使用部分（工学部・先進理工系科学研究科と共用）

（新旧対照表）　校地校舎等の図面　６頁

新	旧
 ・・・先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻使用部分（人間社会科学研究科，先進理工系科学研究科共用）	 ・・・先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻使用部分（人間社会科学研究科，先進理工系科学研究科共用）

（新旧対照表）　学則　１５頁

新	旧
広島大学大学院規則（改正案） 第４条　本学大学院の各研究科に，次の課程及び専攻を置く。 人間社会科学研究科 （略） 広島大学・グラーツ大学国際連携サステイナビリティ学専攻（修士課程） 先進理工系科学研究科 （略） 広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程） （略）	広島大学大学院規則（改正案） 第４条　本学大学院の各研究科に，次の課程及び専攻を置く。 人間社会科学研究科 （略） 広島大学・グラーツ大学国際連携社会科学専攻（修士課程） 先進理工系科学研究科 （略） 広島大学・ライプツィヒ大学国際連携理工学専攻（修士課程） （略）

（新旧対照表）　学則　２８頁

新	旧
広島大学大学院規則（改正案） 第 56 条　人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻において，この規則と異なる取扱いをする場合は，連携外国大学院(当該研究科と連携して教育研究を実施する外国の大学院をいう。)と締結する協定書又は覚書により別に定める。	広島大学大学院規則（改正案） 第 56 条　人間社会科学研究科広島大学・グラーツ大学国際連携社会科学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻において，この規則と異なる取扱いをする場合は，連携外国大学院(当該研究科と連携して教育研究を実施する外国の大学院をいう。)と締結する協定書又は覚書により別に定める。

（新旧対照表）　学則　３８頁

新	旧
広島大学大学院規則（改正案） 附則第 3 項の表	広島大学大学院規則（改正案） 附則第 3 項の表

人間社会科学研究科	（略）
	広島大学・グラーツ大学国際連携サステイナビリティ学専攻
	計
先進理工系科学研究科	（略）
	広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻
	計

人間社会科学研究科	（略）
	広島大学・グラーツ大学国際連携社会科学専攻
	計
先進理工系科学研究科	（略）
	広島大学・ライプツィヒ大学国際連携理工学専攻
	計

（新旧対照表）　学則　３９頁

新	旧
広島大学大学院規則（改正案） 別表（第 5 条関係） 収容定員	広島大学大学院規則（改正案） 別表（第 5 条関係） 収容定員

人間社会科学研究科	（略）
	広島大学・グラーツ大学国際連携サステイナビリティ学専攻
	計
先進理工系科学研究科	（略）
	広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻
	計

人間社会科学研究科	（略）
	広島大学・グラーツ大学国際連携社会科学専攻
	計
先進理工系科学研究科	（略）
	広島大学・ライプツィヒ大学国際連携理工学専攻
	計

（新旧対照表）　学則　４０頁

新	旧
広島大学大学院規則の変更事項 １　変更の事由 （略） ②大学院人間社会科学研究科に，広島大学・グラーツ大学国際連携サステイナビリティ学専攻	広島大学大学院規則の変更事項 １　変更の事由 （略） ②大学院人間社会科学研究科に，広島大学・グラーツ大学国際連携社会科学専攻を設置するこ

を設置することとするため。 ③大学院先進理工系科学研究科に，広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻を設置することとするため。 2　変更の概要 （略） ②大学院人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻及び大学院先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻の設置に伴う本学大学院の研究科に置く課程及び専攻並びに収容定員その他所要の規定の整備を行う。	とするため。 ③大学院先進理工系科学研究科に，広島大学・ライプツィヒ大学国際連携理工学専攻を設置することとするため。 2　変更の概要 （略） ②大学院人間社会科学研究科広島大学・グラーツ大学国際連携社会科学専攻及び大学院先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻の設置に伴う本学大学院の研究科に置く課程及び専攻並びに収容定員その他所要の規定の整備を行う。

（新旧対照表）　学則　４２頁

新	旧
広島大学大学院規則（改正案）新旧対照表	広島大学大学院規則（改正案）新旧対照表
人間社会科学研究科（博士課程） （略） 広島大学・グラーツ大学国際連携サステイナビリティ学専攻（修士課程） 先進理工系科学研究科（博士課程） （略） 広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程）	人間社会科学研究科（博士課程） （略） 広島大学・グラーツ大学国際連携社会科学専攻（修士課程） 先進理工系科学研究科（博士課程） （略） 広島大学・ライプツィヒ大学国際連携理工学専攻（修士課程）

（新旧対照表）　学則　４８頁

新	旧
広島大学大学院規則（改正案）新旧対照表	広島大学大学院規則（改正案）新旧対照表
第 56 条　人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻において，この規則と異なる取扱いをする場合は，連携外国大学院(当該研究科と連携して教育研究を実施する外国の大学院をいう。)と締結する協定書又は覚書により別に定める。	第56条　人間社会科学研究科広島大学・グラーツ大学国際連携社会科学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻において，この規則と異なる取扱いをする場合は，連携外国大学院(当該研究科と連携して教育研究を実施する外国の大学院をいう。)と締結する協定書又は覚書により別に定める。

（新旧対照表）　学則　５０頁－５１頁

新	旧
広島大学大学院規則（改正案）新旧対照表 人間社会科学研究科 （略） 広島大学･グラーツ大学国際連携サステイナビリティ学専攻 計 先進理工系科学研究科 （略） 広島大学･ライプツィヒ大学国際連携サステイナビリティ学専攻 計	広島大学大学院規則（改正案）新旧対照表 人間社会科学研究科 （略） 広島大学・グラーツ大学国際連携社会科学専攻 計 先進理工系科学研究科 （略） 広島大学・ライプツィヒ大学国際連携理工学専攻 計

（新旧対照表）　学則　５４頁

新	旧
広島大学大学院規則（改正案）新旧対照表 人間社会科学研究科 （略） 広島大学･グラーツ大学国際連携サステイナビリティ学専攻 計 先進理工系科学研究科 （略） 広島大学･ライプツィヒ大学国際連携サステイナビリティ学専攻 計	広島大学大学院規則（改正案）新旧対照表 人間社会科学研究科 （略） 広島大学・グラーツ大学国際連携社会科学専攻 計 先進理工系科学研究科 （略） 広島大学・ライプツィヒ大学国際連携理工学専攻 計

（新旧対照表）　学則　５８頁

新	旧
広島大学学位規則（改正案） 第 17 条　人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻において，この規則と異なる取扱いをする場合は，連携外国大学院(当該研究科と連携して教育研究を実施する外国の大学院をいう。)と締結する協定書又は覚書により別に定める。	広島大学学位規則（改正案） 第 17 条　人間社会科学研究科広島大学・グラーツ大学国際連携社会科学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻において，この規則と異なる取扱いをする場合は，連携外国大学院(当該研究科と連携して教育研究を実施する外国の大学院をいう。)と締結する協定書又は覚書により別に定める。

（新旧対照表）　学則　７２－７３頁

新	旧
広島大学学位規則の変更事項 １　変更の事由 （略） ②　大学院人間社会科学研究科に，広島大学・グラーツ大学国際連携サステイナビリティ学専攻を設置することとするため。 ③　大学院先進理工系科学研究科に，広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻を設置することとするため。 ２　変更の概要 （略） ②　人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻において，当該規則と異なる取扱いをする場合は，当該研究科と連携して教育研究を実施する外国の大学院と締結する協定書又は覚書により別に定める旨を規定する。	広島大学学位規則の変更事項 １　変更の事由 （略） ②　大学院人間社会科学研究科に，広島大学・グラーツ大学国際連携社会科学専攻を設置することとするため。 ③　大学院先進理工系科学研究科に，広島大学・ライプツィヒ大学国際連携理工学専攻を設置することとするため。 ２　変更の概要 （略） ②　人間社会科学研究科広島大学・グラーツ大学国際連携社会科学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻において，当該規則と異なる取扱いをする場合は，当該研究科と連携して教育研究を実施する外国の大学院と締結する協定書又は覚書により別に定める旨を規定する。

（新旧対照表）　学則　７４頁

新	旧
広島大学学位規則（改正案）新旧対照表	広島大学学位規則（改正案）新旧対照表
第 17 条　人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻において，この規則と異なる取扱いをする場合は，連携外国大学院(当該研究科と連携して教育研究を実施する外国の大学院をいう。)と締結する協定書又は覚書により別に定める。	第17条　人間社会科学研究科広島大学・グラーツ大学国際連携社会科学専攻及び先進理工系科学研究科広島大学・ライプツィヒ大学国際連携理工学専攻において，この規則と異なる取扱いをする場合は，連携外国大学院(当該研究科と連携して教育研究を実施する外国の大学院をいう。)と締結する協定書又は覚書により別に定める。

（新旧対照表）　当該申請についての意思の決定を証する書類　２頁

新			旧		
協定書を説明する資料 その他			協定書を説明する資料 その他		
○協定書内で使用する用語の定義		・「国際連携教育課程」とは，広島大学･ライプツィヒ大学国際連携サステイナビリティ学専攻を指す。 （略）	○協定書内で使用する用語の定義		・「国際連携教育課程」とは，広島大学･ライプツィヒ大学国際連携社会科学専攻を指す。 （略）

（新旧対照表）　当該申請についての意思の決定を証する書類　１０頁

新	旧
協定書案和訳 ドイツ・ライプツィヒ大学と日本国広島大学との広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻設置に係る協力協定 （略）	協定書案和訳 ドイツ・ライプツィヒ大学と日本国広島大学との広島大学・ライプツィヒ大学国際連携理工学専攻設置に係る協力協定 （略）

（新旧対照表）　当該申請についての意思の決定を証する書類　１０頁

新	旧
協定書案和訳 第２条 定義 “国際連携教育課程”とは，ＬＵとＨＵが共同で運営する学位課程“広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻”を指す。この国際連携教育課程では，LU と HU は，共同で教育を行い，修了要件を満たした学生に対し共同で単一の学位を授与する。 “JP 学生”とは，国際連携教育課程に入学した学生を指す。 “ホーム大学”とは，本協定書の当事者であり，かつ学生が入学手続きをした大学を指す。 “相手大学”とは，本協定書の当事者であり，ホーム大学ではない大学を指す。	協定書案和訳 第２条 定義 “国際連携教育課程”とは，ＬＵとＨＵが共同で運営する学位課程“広島大学・ライプツィヒ大学国際連携理工学専攻”を指す。この国際連携教育課程では，LU と HU は，共同で教育を行い，修了要件を満たした学生に対し共同で単一の学位を授与する。 “JP 学生”とは，国際連携教育課程に入学した学生を指す。 “ホーム大学”とは，本協定書の当事者であり，かつ学生が入学手続きをした大学を指す。 “相手大学”とは，本協定書の当事者であり，ホーム大学ではない大学を指す。

（新旧対照表）　設置の趣旨等を記載した書類　表紙

新	旧
設置の趣旨等を記載した書類 広島大学大学院先進理工系科学研究科 広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻	設置の趣旨等を記載した書類 広島大学大学院先進理工系科学研究科 広島大学・ライプツィヒ大学国際連携理工学専攻

（新旧対照表）　設置の趣旨等を記載した書類　１頁

新	旧
Ⅰ　設置の趣旨及び必要性 １．背景・社会的要請 (2) 持続可能な開発の学問分野 （略） 本申請で提案する学問分野「持続可能な開発学（サステイナビリティ学）」は，上記の環境学における従来の持続可能な開発論に，開発学における国際協力論を統合し，持続可能な開発目標 SDGs の実現を目指す応用学際領域であると定義する。	Ⅰ　設置の趣旨及び必要性 １．背景・社会的要請 (2) 持続可能な開発の学問分野 （略） 本申請で提案する学問分野「持続可能な開発学」は，上記の環境学における従来の持続可能な開発論に，開発学における国際協力論を統合し，持続可能な開発目標 SDGs の実現を目指す応用学際領域であると定義する。

（新旧対照表）　設置の趣旨等を記載した書類　１１頁

新	旧
Ⅲ　専攻の名称及び学位の名称 １．専攻及び学位の名称 専攻名は，広島大学とライプツィヒ大学の連携によって遂行される理工学分野における持続可能な開発学系の学際的な教育研究を行う大学院修士課程として，「広島大学大学院先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻」とする。（略）	Ⅲ　専攻の名称及び学位の名称 １．専攻及び学位の名称 専攻名は，広島大学とライプツィヒ大学の連携によって遂行される理工学分野における持続可能な開発学系の学際的な教育研究を行う大学院修士課程として，「広島大学・ライプツィヒ大学国際連携理工学専攻」とする。（略）

（新旧対照表）　設置の趣旨等を記載した書類　１２頁－１３頁

新	旧
Ⅲ　専攻の名称及び学位の名称 ２．当該名称とする理由及び国際通用性 本専攻は，持続可能な開発学領域において，環境学や都市工学分野で授業を提供する広島大学と，持続可能な開発におけるエネルギー工学や資源管理分野でプログラムを提供するライプツィヒ大学が，双方の特徴を活かし，自然科学全般の視点も含め持続可能な開発に関する学際的な教育課程である。従って，本専攻は，「広島大学大学院先進理工系科学研究科広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻」という名称を付し，授与する学位は「修士（学術）」とする。 「サステイナビリティ学」とは，細分化された個々の学問領域では解決できない地球的課題に対し，人文社会科学や自然科学といった境界を越えた俯瞰的な観点から取り組むための学問である。歴史的には，21 世紀に入り世界では，地球温暖化，生物多様性の減少，貧困問題などの地球規模課題が顕著となったことにより，その重要性が国際的に広く認識されるようになった。 専攻名及び学位の英語名称の国際通用性について，連携外国大学のライプツィヒ大学は，既に欧州の他大学と同専攻名称及び学位名称で，同様の分野における国際連携教育課程を実施してきた実績を有している。 また，例えば，東京大学では，平成 17 年に「サステイナビリティ学連携研究機構構想」を設置しており，平成 22 年には一般社団法人サステイナビリティ・サイエンス・コンソーシアムが設立されている。その後，平成 23 年には博士課程教育リーデングプログラム「サステイナビリティ学グローバルリーダー養成大学院プログラム」が採択されている。 イギリスのサセックス大学においては，持続可能性への転換に関する政策と政治について教育を行う Sustainable Development 修士課程プログラムで，Master of Science を授与している。本専攻ではより学際的な視点から学生を養成することを狙いとしているため，「Sustainable Development」を含む英語名称を採用しており，この名称自体は国際通	Ⅲ　専攻の名称及び学位の名称 ２．当該名称とする理由及び国際通用性 本専攻は，持続可能な開発学領域において，環境学や都市工学分野で授業を提供する広島大学と，持続可能な開発におけるエネルギー工学や資源管理分野でプログラムを提供するライプツィヒ大学が，双方の特徴を活かし，自然科学全般の視点も含め持続可能な開発に関する学際的な教育課程である。従って，本専攻は，「広島大学・ライプツィヒ大学国際連携理工学専攻」という名称を付し，授与する学位は「修士（学術）」とする。（略） 専攻名及び学位の英語名称の国際通用性について，連携外国大学のライプツィヒ大学は，既に欧州の他大学と同専攻名称及び学位名称で，同様の分野における国際連携教育課程を実施してきた実績を有している。 また，例えば，イギリスのサセックス大学においては，持続可能性への転換に関する政策と政治について教育を行う Sustainable Development 修士課程プログラムで，Master of Science を授与している。本専攻ではより学際的な視点から学生を養成することを狙いとしているため，「Sustainable Development」を含む英語名称を採用しており，この名称自体は国際通用性を有している。

用性を有している。 さらに，「サステイナビリティ学」が世界的に広く通用していることの根拠として，以下のことが挙げられる。 ・国際サステイナビリティ学会（International Society for Sustainability Science (ISSS)）の発足（2012 年 2 月，アリゾナ州での第 3 回サステイナビリティ学国際会議にて） ・国際学術誌「サステイナビリティ・サイエンス」の刊行（2007 年，シュプリンガー社）（サステイナビリティ学の論文数は，2013 年現在，約 7,000 本（東京大学　武内和彦教授調べ）） このように，「サステイナビリティ学」という用語を名称に用いた大学等の研究教育組織は世界的に多く存在しており，「サステイナビリティ学」に関する国際学会や国際学術雑誌も存在している。各研究教育組織においては，それぞれに強みのあるアプローチが採用されているが，「サステイナビリティ学」という共通の名称が広く使用されているのが，世界的な状況である。「サステイナビリティ学」は，その出所からして本質的に極めて学際的な学問であり，特定の分野を示す語を付加した名称が使用されることはなく，共通して「サステイナビリティ学」を使用することが世界的な潮流となっている。 「サステイナビリティ学」は，本質的に極めて学際的な学問であるため，別途申請中の人間社会科学研究科でのグラーツ大学との国際連携専攻も同様に，「人間社会科学研究科広島大学・グラーツ大学国際連携サステイナビリティ学専攻」（英語の専攻名称は，Joint International Master’s Programme in Sustainable Development (Hiroshima University and University of Graz)）の名称を使用する。 ２つの専攻は，それぞれが属する研究科名称で明らかなとおり，「サステイナビリティ学」のアプローチが異なっている。また，本専攻の教育課程については，専門科目の「Environmental Management」「Development Technology」「Transportation Engineering」等の科目編成からも，理工学的アプローチと認識されるものと考える。「サステイナビリティ学」のアプローチには様々なものがあることから，２つの専攻は，一部の教育課程で相互に連携して教育効果を高める。両専攻の教育課程は，ベーシック科目では専門性にとらわれない幅広い科目を学び，Specialization 科目では各自の専門性を深め，Integration 科目では社会科学系，理工学系の枠を超えた学際性を身に付ける構造である。	

（新旧対照表）　設置の趣旨等を記載した書類（資料目次）

新	旧
先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻 （略）	先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携理工学専攻 （略）

（新旧対照表）　設置の趣旨等を記載した書類（資料２）　１頁

新	旧
広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻 養成する人材像と３つのポリシーの対比表	広島大学・ライプツィヒ大学国際連携理工学専攻 養成する人材像と３つのポリシーの対比表

（新旧対照表）　設置の趣旨等を記載した書類（資料４）　１頁

新	旧
先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻 修了までのスケジュール	先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携理工学専攻 修了までのスケジュール

（新旧対照表）　学生の確保の見通し等を記載した書類　１頁

新	旧
（１）学生の確保の見通し及び申請者としての取組状況 ①　学生の確保の見通し ア　定員充足の見込み （略） 広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（以下「本専攻」という。），当該プログラムを基礎とするジョイント・ディグリープログラムである。（略）	（１）学生の確保の見通し及び申請者としての取組状況 ①　学生の確保の見通し ア　定員充足の見込み （略） 広島大学・ライプツィヒ大学国際連携理工学専攻（以下「本専攻」という。），当該プログラムを基礎とするジョイント・ディグリープログラムである。（略）

（新旧対照表）　教員名簿［教員の氏名等］　１頁

新	旧
教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（広島大学）	教　員　の　氏　名　等 （先進理工系科学研究科　広島大学･ライプツィヒ大学国際連携理工学専攻（修士課程））（広島大学）

（新旧対照表）　教員名簿［教員の氏名等］　２頁

新	旧
教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（広島大学）	教　員　の　氏　名　等 （先進理工系科学研究科　広島大学･ライプツィヒ大学国際連携理工学専攻（修士課程））（広島大学）

（新旧対照表）　教員名簿［教員の氏名等］　３頁

新	旧
教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（広島大学）	教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携理工学専攻（修士課程））（広島大学）

（新旧対照表）　教員名簿［教員の氏名等］　４頁

新	旧
教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（広島大学）	教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携理工学専攻（修士課程））（広島大学）

（新旧対照表）　教員名簿［教員の氏名等］　５頁

新	旧
教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（ライプツィヒ大学）	教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携理工学専攻（修士課程））（ライプツィヒ大学）

（新旧対照表）　教員名簿［教員の氏名等］　６頁

新	旧
教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程））（ライプツィヒ大学）	教　員　の　氏　名　等 （先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携理工学専攻（修士課程））（ライプツィヒ大学）

（新旧対照表）　専任教員の年齢構成・学位保有状況　１頁

新	旧
専任教員の年齢構成・学位保有状況 【先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（修士課程）】	専任教員の年齢構成・学位保有状況 【先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携理工学専攻（修士課程）】

（改善事項）先進理工系科学研究科　広島大学・ライプツィヒ大学国際連携サステイナビリティ学専攻（M）

４．連携大学からの学生への配慮の観点から、英語若しくは連携大学の母国語によるシラバスが適切に作成されている必要があることから、英語若しくは連携大学の母国語によるシラバスを示すこと。

（対応）

連携外国大学からの学生に配慮し，別紙のとおり英語によるシラバスを作成します。

別 紙

Joint International Master's Programme in Sustainable Development (Hiroshima University and Leipzig University), Graduate School of Advanced Science and Engineering

Index of Syllabus

1. Basic Course

(1) Hiroshima University

①Common Graduate Couse/ SDGs Course

②Common Graduate Course/ Career Development, Data Literacy

③Common Graduate School Course

④Foundation Course

(2) Leipzig University

Subject Name: Hiroshima から 世界平和を考える	Subject Name in English: World Peace and HIROSHIMA	Credits: 1	Instructor: Kawano Noriyuki, Komiyama Michio, Nakatsubo Takayuki, Yamane Tatsuo, Kawai Kouichirou
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

Located in Hiroshima, where the whole population suffered the Atomic Bombing, Hiroshima University puts up the banner of spirit of seeking peace. The objectives of this course are to review the damages of atomic bombing that have shaped the current HIROSHIMA's identity, and to seek for the way in which we should achieve universal and eternal peace, referring to HIROSHIMA as the starting point. As such, this course deals with the issues of poverty, famine, refugee, environment, and conflicts around the globe, and examines how the ideal peace should be, recognizing to the difference between ideal and real society.

Class Schedule

The 1st: Introduction, What is "peace". (Kawano)
The 2nd: Outline of Atomic-Bomb Affliction (Kawano)
The 3rd: History of Hiroshima: Society and Culture in Pre-WWII Hiroshima (Komiyama)
The 4th: Atomic Bomb and Hiroshima University: History of University's Committoment toward Peace (Komiyama)
The 5th: The Challenges of Poverty, Starvation and Food Production in the Developing Countries (Kawai)
The 6th: Current Situations and Solutions of Global Warming, Environment Destruction, and Depletion of Natural Resurces (Nakatsubo)
The 7th: Traits of Regional Conflicts in the Modern Era and Post-Conflict Peacebuilding (Yamane)
The 8th: Traits of Regional Conflicts in the Modern Era and Post-Conflict Peacebuilding (Yamane)

Text / Reference Books, etc.:

There is no textbook. Instructors will distribute handouts when necessary.
Reference books may be introduced in class.

Grading Method:

Grades will be awarded on the basis of regular attendance, class participation (30%) and a report (70%).
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Japanese Experience of Social Development-Economy, Infrastructure, and Peace	Subject Name in English: Japanese Experience of Social Development-Economy, Infrastructure, and Peace	Credits: 1	Instructor: Kaneko Shinji, Yoshida Yuichiro, Yoshida Osamu, Zhang Junyi, Katayanagi Mari, Ichihashi Masaru, Misumi Sachiko
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

This course intends to discuss the issues of SDGs under the Guiding principles of Hiroshima University "Pursuit of Peace" and the long-term vision "Splendor Plan 2017". The SDGs sets sustainability as a core of the global issues. Such a broad issue always involves many related issues. Resolution of one issue may produce another issue. It is important to consider cross-disciplinary approach and historical aspect. Also inclusiveness is an important principle of SDGs, and thus all countries, developed and developing countries, should collaborate to tackle these.

When considering these cross-disciplinary approach, history, and inclusiveness of development, Japanese experience of development provides an important case, because Japan, among non-European countries, is the first country which has become a member of OECD. Here, we can learn many points from the developing efforts whether they are success or failure. These efforts, including development assistance, are connected to Japanese society of today. On the other hand, Japan currently faces such new issues as rapid aging and depopulation. Thus this course discusses Japanese experience of social development from the above aspects.

Class Schedule

lesson1 Shinji Kaneko "Guidance of the course"
lesson2 Sachiko Misumi "JICA chugoku center"
lesson3 Yuichiro Yoshida "Japanese policy experience: Success and Failures"
lesson4 Masaru Ichihashi "Industrial Policy and Economic growth"
lesson5 Junyi Zhang "History of environmental policies in Japan"1
lesson6 Junyi Zhang "History of environmental policies in Japan"2
lesson7 Osamu Yoshida "Japanese ODA and its Asia Policy"
lesson8 Mari Katayanagi "Reconstruction of Hiroshima from Peacebuilding Perspective"

Text / Reference Books, etc.:

Teaching and reading materials will be provided in the class

Grading Method:

30% Attendance and discussion, 70% Final report

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Japanese Experience of Human Development-Culture, Education, and Health	Subject Name in English: Japanese Experience of Human Development-Culture, Education, and Health	Credits: 1	Instructor: BaBa Takuya, Shimizu Kinya, Tanaka Junko, Moriyama Michiko, Maharajan Keshav Lall, Seki Koki
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

This course intends to discuss the issues of SDGs under the Guiding principles of Hiroshima University “Pursuit of Peace” and the long-term vision “Splendor Plan 2017”. The SDGs sets sustainability as a core of the global issues. Such a broad issue always involves many related issues. Resolution of one issue may produce another issue. It is important to consider cross-disciplinary approach and hisotorical aspect. Also inclusiveness is an important principle of SDGs, and thus all countries, developed and developing countries, should collaborate to tackle these.

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Class Schedule

lesson1 Takuya Baba “Guidance of the course”
lesson2 Maharjan Keshav Lall “Japanese experience of development in Agriculture and Remote area”
lesson3 Koki Seki “Socio-cultural Aspect of Modernization of Japan: Focusing on the Transformation of Norm, Mentality, and Way of Living”
lesson4 Kinya Shimizu “A History of Education in Japan”
lesson5 Kinya Shimizu “Lesson Study in Japan: As a tool of PDSI in Japanese Education”
lesson6 Junko Tanaka “International cooperation and research collaboration in the field of public health”
lesson7 Michiko Moriyama "Healthcare system in Japan: its characteristics and history"
lesson8 Takuya Baba “Discussion”

Text / Reference Books, etc.:

Edwin O. Reischauer (1964) "Japan : past and present"
Ruth Benedict (1954; 2010) "The chrysanthemum and the sword"

Grading Method:

Mini report will be submitted every lesson. In addition contribution in each lesson and discussion will be evaluated.
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: SDGsへの学問的アプローチA	Subject Name in English: Academic approach to SDGs - A	Credits: 1	Instructor: BABA Takuya, SANEOKA Hirofumi, TANAKA Junko, MORIYAMA Michiko, RAHMAN MD MOSHIUR, NAGATA Ryota, ISHIDA Yoko, KUMAMOTO Mihoko
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

The common programmes for the master's course are established as a part of Hiroshima-model of liberal arts education. They go together with the undergraduate liberal arts courses, in line with the Sustainable Development Goals (SDGs), the international goals, as well as Hiroshima University's long-term vision, the Splendor Plan 2017. SDGs present the challenges of our period and society with the sustainability in its core. These challenges cannot be resolved independently, as they require inter-disciplinary continuity and temporal continuity. Moreover, their solution demands a new approach of the society in which not only donor countries and recipient countries, but also local government, private enterprises and civil society work together.

In this "Academic Approach to SDGs A" course, human rights are the focus. It is recommended to take "Academic Approach to SDGs B" as well. The goal of this course is to be able to analyze today's society from the perspectives of your own specialzied field and social sustainability, and to discuss the solution with experts in other fields.

Class Schedule (The number inside the parenthesis indicates the corresponding goal(s) among the 17 goals of SDGs.)

First Session: Course guidance, SDGs and poverty (1, 17)

Explain the background of SDGs as the international goals and discuss that poverty is located at the base of various problems toward attainment of the 17 goals. (BABA)

Second Session: Sustainable consumption and starvation (2, 12)

Considering food sustainability at the global level, there is a problem of imbalance distribution between the developed and the developing countries. Discuss sustainable production-consumption, nutrient improvement and so on. (SANEOKA)

Third Session: Public health and social medicine (3, 6)

Discuss on sustainable management and its problems from the perspectives of social medicine and public health for health maintenance including prevention of disceses.

Providing and securing safe water is essential for human health. (TANAKA)

Fourth Session: Health and welfare (3)

Discuss on such global health issues as primary health care, reproductive health, non-contageious descise and aging. (MORIYAMA, RAHMAN)

Fifth Session Education and soceity (4)

The border between the developed and developing countries is disappearing due to the rapid growth of information technology. Discuss the role of education for future society and its issues. (NAGATA)

Sixth Session: Gender and euqitable scoeity (5,10)

Discuss the issues such as gender equality, empowerment of women, and reduction of inequality across countries and within a country, and the close relation between sovling these issues and attainment of other golas of SDGs. (ISHIDA)

Seventh Session: Engagement by International organization (17)

Discuss the progress and issues of the engament by International Organizations, which are to promote attainment of SDGs. (KUMAMOTO)

Eighth Session: Overall discussion

Discuss based on previous sessions. (BABA)

Text / Reference Books, etc.:

Norichika Kanie, SDGs toha Nanika ? 2030 ni Muketa Henkaku no Agenda

Norichika Kanie, Mirai wo Kaeru Mokuhyo SDGs Idea Book

Tanaka Haruhiko, SDGs to Kaihatsu Kyoiku: Jizoku Kanouna Kaihatsu Mokuhyou ta meno Manabi etc

Grading Method:

Total score (40 points) consists of Short report for each session (5points×7 session) and Participation in the discussion in the last session (5 points). Total score is multiplied by 2.5 and is converted to 100 points in total. The final evaluation is done according to the following criterion.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: SDGsへの学問的アプローチB	Subject Name in English: Academic approach to SDGs - B	Credits: 1	Instructor: KATAYANAGI Mari, HASEGAWA Yuji, SANO Koichiro, KAWAI Kenji, HIBINO Tadafumi, KOIKE Kazuhiko, KAWAMOTO Ryoji
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

The common programmes for the master's course are established as a part of Hiroshima-model of liberal arts education. They go together with the undergraduate liberal arts courses, in line with the Sustainable Development Goals (SDGs), the international goals, as well as Hiroshima University's long-term vision, the Splendor Plan 2017. SDGs present the challenges of our period and society with the sustainability in its core. These challenges cannot be resolved independently, as they require inter-disciplinary continuity and temporarl continuity. Moreover, their solution demands a new approach of the society in which not only donor countries and recipient countries, but also local government, private enterprises and civil society work together. In this "Academic Approach to SDGs B" course, the focus will be on environment, society and governance. It is recommended to take "Academic Approach to SDGs A" as well.

Class Schedule

1. Introduction of the course and peaceful society（Goal 16）

The process how SDGs were created will be explained, and we will discuss the ultimate goalof realizing the peaceful society. (Katayanagi)

2. Climate change and disaster prevention（Goal 13）

Discussion will be on disaster prevneion to reduce the influence of climate change which is increasingly significant, and emergency measures. (Hasegawa)

3. Energy and sustainable city（Goals 7 and11）

We will discuss how we can ensure citizens' access to cheap, reliable and sustainable energy, circulate resources, and realize inclusive, resilient and sustainable environment. (Hibino)

4. Economic growth and employment (Goal 8)

Discussion will be on realization of employment for all and working environment which motivates workers, as well as the possibility and challenges of sustainable economic growth. (Sano)

5. Infrasturucture and industries（Goal 9）

Building of inclusive and resilient infrastructure, sustainable industrialization as well as possibility and challenges of innovation will be discussed. (Kawai)

6. Land resources and biological resources (Goals 14 and 15)

Lecture will be on dilemma between utilization of biological resources in agriculture, animal husbandry and fisheries industry, and preservation of ecological system. (Koike)

7. Efforts of local community（local government）（Goals 17 and11）

Various efforts of a local government in Hiroshima Prefecture will be discussed from the aspect of SDGs. (Kawamoto)

8. Overall discussion

Based on the seven lectures above, SDGs will be discussed. (Katayanagi)

Text / Reference Books, etc.:

Norichika Kanie, SDGs toha Nanika ? 2030 ni Muketa Henkaku no Agenda

Norichika Kanie, Mirai wo Kaeru Mokuhyo SDGs Idea Book

Tanaka Haruhiko, SDGs to Kaihatsu Kyoiku: Jizoku Kanouna Kaihatsu Mokuhyou ta meno Manabi etc

Grading Method:

Evaluation will be based on report on every lecture and the level of participation in discussion.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: ダイバーシティの理解	Subject Name in English: Understanding Diversity and Inclusion	Credits: 1	Instructor: Kitakaji Yoko, Ooike Machiko, Sakurai Riho Sakata Kiriko
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

The students are (1) to understand the idea of diversity and inclusion in terms of gender, sexuality, cultural background, and other factors in lectures, (2) to learn about challenges and solutions in real situations through workshops and (3) to envision how to build and live in a diverse and inclusive society.

Class Schedule

Intensive two-day lectures on August 8th and 9th. The students are to take part in workshops, a half-day company visit, discussion, presentation

Day 1

Lectures on diversity and inclusion in schools and workplaces (lesson 1 to 3)

A workshop to understand diversity and inclusion (lesson 4)

Day 2

Visiting a company focusing on diversity and inclusion (lesson 5 to 6)

Discussion and presentation (lesson 7 to 8)

Details of the company visit will be announced on the first day of class.

Text / Reference Books, etc.:

various learning materials are to be delivered in class

Grading Method:

Class performance and report

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: データリテラシー	Subject Name in English: Data Literacy	Credits: 1	Instructor: Yanagihara Hirokazu Miyao Junichi
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

We study statistical inference and machine learning for the first step of data science

Class Schedule

lesson1 (Statistical inference) Data reading

lesson2 (Statistical inference) Studying the shape of data distribution

lesson3 (Statistical inference) Data filing and searching

lesson4 (Statistical inference) Hypothesis testing

lesson5 (Machine learning) Features of big data, and its applications

lesson6 (Machine learning) Fundamentals of machine learning

lesson7 (Machine learning) Potential of machine learning

lesson8 (Machine learning) Notices and summary

Text / Reference Books, etc.:

Not specified

Grading Method:

Report

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

<table>
<tr><td rowspan="2">Subject Name:
医療情報リテラシー</td><td rowspan="2">Subject Name in English:
Data Literacy in Medicine</td><td>Credits:
1</td><td>Instructor:
Tanaka Junko, Ozasa Koutarou, Arihiro Kouji, Oue Naohide, Awai Kazuo, Kudo Yoshiki, Morino Hiroyuki, Kubo Tatsuhiko, Tanaka Go</td></tr>
<tr><td>Lesson Style:
Lecture</td><td>Teaching Style:
Omnibus</td></tr>
<tr><td colspan="4">Class Objectives / Class Outline
To learn basic explanations about the knowledge required to process medical information, as well as information security, ethics, laws,etc.</td></tr>
<tr><td colspan="4">Class Schedule
lesson1 Classifications, outlines and ethics of large medical databases such as National Data Base (NDB)
lesson2 Classifications of image data in the medical field, ethical issues, usefulness of information
lesson3 How to handling and analysis the medical information in the view of the ethical aspect of epidemiological research in the medical field
lesson4 Overview of cancer genome information, ethical issues
lesson5 Medical research using large scale long-term information, the atomic bomb survivors cohort data
lesson6 How to establish standard clinical data set during emergencies
lesson7 Classifications of genomic information and ethical rules,　merits, demerits and usefulness for research using genomic information
lesson8 Mechanism for sharing medical information using Hiroshima's original HM net (Hiroshima Medical Information Network)</td></tr>
<tr><td colspan="4">Text / Reference Books, etc.:
Learning materials are to be delivered in class</td></tr>
<tr><td colspan="4">Grading Method:
Report assingments will be submitted every lesson. In addition contribution in each lesson will be evaluated.
Students who fail to attend at least two - thirds of the classes will not be eligible for grading.
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60</td></tr>
</table>

Subject Name: 人文社会系キャリアマネジメント	Subject Name in English: Career Management - Theory & Career Development	Credits: 2	Instructor: Misu Toshiyuki
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

This course has three main objectives;

1. To discuss career theories

2. To get the information about yourself and society

3. To develop competency through seminar

Class Schedule

lesson 1：Introduction to course

lesson 2：To be aware of self-identification and " up-to-coming manpower "

lesson 3：To be aware of　" up-to-coming manpower "

lesson 4：Lecture ; Summary of Career Theory

lesson 5：Student presentation & discuss the career theory 1

lesson 6：Logical writing 1

lesson7　：Logical writing 2

lesson 8：Student presentation & discuss the career theory 2

lesson 9：Communication

lesson 10：Presentation

lesson 11：Debate

lesson 12：Problem solving

lesson 13：Logical thinking

lesson 14：Designing your own career

lesson 15：Wrap up in class

No exam.

Text / Reference Books, etc.:

No textbook

Grading Method:

Grading is determined by ;1. Report (50%), 2.　presentation (50%)

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 理工系キャリアマネジメント	Subject Name in English: Career Management for Engineer	Credits: 2	Instructor: Harada Jun
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Basic communication skills, Basic presentation sukills, Basic active listening skills, Basic facilitation skills

Class Schedule

lesson1 Orientation

lesson2 Basic communication skills

lesson3 Practice(communication)

lesson4 Practice(communication)

lesson5 How to write research summary

lesson6 Basic presentatin skills

lesson7 Practice(presentation)

lesson8 Active listening skills

lesson9 Practice(active listening)

lesson10 Practice(active listening)

lesson11 Facilitation skills

lesson12 Practice(orientation)

lesson13 Practice(discussion)

lesson14 Practice(discussion)

lesson15 Summary

Text / Reference Books, etc.:

Non

Distrivution of PPT resume

Grading Method:

Fruitful attitude for the class(50%), Report(50%)

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: ストレスマネジメント	Subject Name in English: Stress Management	Credits: 2	Instructor: Harada Jun
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Today, we experience significant amount of psychological and social stress everywhere. There are various factors that cause stress, including pressure from work, human relationships, and an overcrowded or busy social environment. Handling stress inappropriately can negatively affect mental/physical health and interpersonal relationships, thereby reducing the productivity of the individual and/or organization. Therefore, it is important to handle stress appropriately in order to successfully work in a company or thrive in society. In this lecture, I will explain stress and its effects, introduce ways of recognizing it, and discuss specific coping techniques for handling stress.

Class Schedule:

lesson1 Orientation
lesson2 Stress and stress response
lesson3 Beneficial stress and harm stress
lesson4 Characteristics of the psychological and social stress
lesson5 The goal of stress management
lesson6 Overcoming feelings of conflict that love-hate
lesson7 Resilience
lesson8 Action methods for stress management
lesson9 Mindfulness
lesson10 Solution to anxiety
lesson11 Meditation
lesson12 Rewriting of the negative storage
lesson13 Release from the obsession
lesson14 Stress in work
lesson15 Summary

Text / Reference Books, etc.:

"Stress and stress management"

Grading Method:

Fruitful attitude for the class(50%), Reoprt(50%)

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: MOT 入門	Subject Name in English: Introduction to MOT	Credits: 1	Instructor: Ito Takao
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

This course introduces students the management process within an organization. The primary objective of this course is to familiarize the students with knowledge roles, corporate responsibilities, managerial functions and skills required of effective modern managers. Topics covered include: efficiency and effectiveness, evolution of the management, framework of management systems, cost-benefit analysis, ethics, quality control, stock control, organization structure, technological strategy, motivation, leadership, business plan, and venture business.

Class Schedule

1 Outlines and Introduction

2 Key Issues in Corporate Management

3 Break-Even Point Analysis

4 Psychological Issues and Motivation

5 Kaizen and Quality Control

6 JIT and Stock Control

7 Corporate Strategy Building

8 Summary

Final Examination

Presentation and/or Final Examination is required as scheduled

Text / Reference Books, etc.:

1)Tidd J. and Bessant J. (2013), Managing Innovation, 5th Edition, Chichester: Wiley.

2)Burgelman R. A., Christensen C. M. and Wheelwright S. C. (2009), Strategic Management of Technology and Innovation, 5th Edition, New York: McGraw-Hill.

3)Takao Ito (2002) Information and Network Organization, Hakuto-Shobo Publishing Company

Grading Method:

Learning Attitude 25%＋Reports 30%＋Final examination orPresentation 45%

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: アントレプレナーシップ概論	Subject Name in English: Entrepreneurship	Credits: 1	Instructor: Makino Emi
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

In Japan, the word “entrepreneurship” is often translated as “entrepreneurial spirit.” In this course, entrepreneurship is defined as a practice that can be learned and indeed, practiced, as opposed to something mystical. Over the past few decades, management research has made great progress towards our understanding of entrepreneurship as a practice. In this course, students are introduced to the decision-making logic preferred by expert entrepreneurs called effectuation. In-class exercises and case analyses will help students understand the method so that they can consider how entrepreneurship applies to them. Students learn the scientific method even if they will not become scientists. Similarly, learning about entrepreneurship will likely be useful for all students, not just those wanting to become entrepreneurs. At the end of the course, students will visualize their desired careers and futures, and consider how they can apply the entrepreneurial to realize those aspirations.

Text / Reference Books, etc.:

Class 1　Orientation /　Transformation to a Knowledge Society
Class 2　Risk and uncertainty
Class 3　Entrepreneurial Process 1
Class 4　Entrepreneurial Process 2
Class 5　Entrepreneurial Thinking and Action 1
Class 6　Entrepreneurial Thinking and Action 2
Class 7　Strengths and passion
Class 8　Exercise using Lego™ bricks / Final reflection
Quiz

Text / Reference Books, etc.:

Kander, Diana. All in Startup: Launching a New Idea When Everything is on the Line. Wiley, 2014.
Other references will be announced in class

Grading Method:

This course is heavily action learning oriented, and therefore, active participation in group work and other class activities is a must. Some assignments cannot be completed if students are absent from class.
Grading Criteria: Contribution 40%, Assignments 40%, Quiz 20%
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: MOT とベンチャービジネス論	Subject Name in English: MOT and Venture Business	Credits: 1	Instructor: Ito Takao
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

This course introduces students the management process within an organization. The primary objective of this course is to familiarize the students with knowledge roles, corporate responsibilities, managerial functions and skills required of effective modern managers. Topics covered include: efficiency and effectiveness, evolution of the management, framework of management systems, cost-benefit analysis, ethics, quality control, stock control, organization structure, technological strategy, motivation, leadership, business plan, and venture business.

Class Schedule

1 Outlines and Introduction

2 Key Issues in Corporate Management

3 Break-Even Point Analysis

4 Psychological Issues and Motivation

5 Design of Corporate Structure

6 Corporate Strategy Building

7 Business Plan

8 Summary

Final Examination

Presentation and/or Final Examination is required as scheduled

Text / Reference Books, etc.:

1） Tidd J. and Bessant J. (2013), Managing Innovation,5th Edition, Chichester: Wiley.

2) Burgelman R. A., Christensen C. M. and Wheelwright S. C. (2009), Strategic Management of Technology and Innovation, 5th Edition, New York: McGraw-Hill.

3） Takao Ito (2002) Information and Network Organization, Hakuto-Shobo Publishing Company

Grading Method:

Learning attitudes25%+ Report 30%+ Final Examination45%

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 技術移転論	Subject Name in English: Technology Transfer	Credits: 1	Instructor: Ito Takao
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

This course presents the principles of technology transfer, and introduces successful determinants of technology transfer. All important issues including foreign direct investment, managerial resources, patent, entrepreneurship, localization strategy will be explained using cases of construction machines, and printing industry.

Class Schedule

Topic 1　Outlines and Introduction

Topic 2　Technology and Management

Topic 3　Technology Transfer and Intellectual property

Topic 4　Marketing Strategy for Technology Transfer

Topic 5　Localization Strategy and Manufacturing Technology Transfer

Topic 6　Case Study: Shipbuilding

Topic 7　A Comparative Study on Japanese Firm in Indonesia

Topic 8　Summary

Presentation and/or Final Examination is required as scheduled

Text / Reference Books, etc.:

1)J. Morrison (2002) The Global Business Environment,3rd Edition, Palgrave Macmillan.

2)A. Grubler (1998)Technology and Global Change, Cambridge University Press.

Grading Method:

Learning attitudes25%+ Report 30%+ Final Examination45%

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 技術移転演習	Subject Name in English: PBL for Technology Transfer	Credits: 1	Instructor: Toru Takashina
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

This course is focusing on "Technology Transfer including not only the conventional methods for the technology transfer but also the wide varieties of the technology transfer activities", in particular, "Technology Transfer for Enhancement of International Japanese-styles Manufacturing" and is based on Practice Based Learning (PBL). In this course, the presentations and discussions regarding the overseas internship done by the students are very much emphasized, therefore, the students can share the cross cultural experience of the international internship (Internship in Japan for international students, Overseas internship for Japanese students) and obtain the international understandings for the technology transfer.

Class Schedule

Lessoon1 Guidance
Lessoon2 Presentation by the students of the international collaboration research program and discussion (1)
Lessoon3 Presentation by the students of the international collaboration research program and discussion (2)
Lessoon4 Presentation by the students of the international collaboration research program and discussion (3)
Lessoon5 Presentation by the students of the international collaboration research program and discussion (4)
Lessoon6 Presentation by the ECBO students and discussion (1)
Lessoon7 Presentation by the ECBO students and discussion (2)
Lessoon8 Presentation by the ECBO students and discussion (3)
Lessoon9 Presentation by the ECBO students and discussion (4)
Lessoon10 Presentation by the international students and discussion (1)
Lessoon11 Presentation by the international students and discussion (2)
Lessoon12 Presentation by the international students and discussion (3)
Lessoon13 Presentation by the other students and discussion (1)
Lessoon14 Presentation by the other students and discussion (2)
Lessoon15 Wrap-up discussion

Text / Reference Books, etc.:

None

Grading Method:

Presentation (50%), Discussion (50%)

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: データビジュアライゼーション A	Subject Name in English: Data Visualization A	Credits: 1	Instructor: Kawada Keisuke
		Lesson Style: Lecture	Teaching Style : Individual

Class Objectives / Class Outline

The lecture discusses how to visualize social data from concept to computer implementation. In the class, students first learn the basic statistical concepts and drawing methods necessary to intuitively understand the characteristics of data. In parallel, the students also learn how to implement using R, which is free statistical software, in a practical form. These methods are widely recognized as an extremely useful tool for visualizing the characteristics of data that cannot be measured by traditional statistics such as mean and variance as the scale of data increases.

The objectives of this lecture are (1) understanding the drawing method of drawing data together with basic statistical concepts, and (2) actually drawing with R.

Class Schedule

Class 1 Guidance

Class 2 Distribution, density and mean, variance and quantile 1

Class 3 Distribution, density and mean, variance and quantile 2

Class 4 Relation between variables 1

Class 5 Relation between variables 2

Class 6 Comparison between groups 1

Class 7 Comparison between groups 1

Class 8 Summary

Text / Reference Books, etc.:

Imai, K. (2018). Quantitative social science: An introduction. Princeton University Press.

Grading Method:

Evaluation is made by contribution to the class, class reports and final report:

Criteria:

- Understanding fundamental statistical concepts necessary for graphical presentations
- Ability to make graphical presentations with R.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: データビジュアライゼーション B	Subject Name in English: Data Visualization B	Credits: 1	Instructor: Kawada Keisuke
		Lesson Style: Lecture	Teaching Style : Individual

Class Objectives / Class Outline

The lecture discusses how to visualize social data, from concept to computer implementation. In this lecture, after learning about the prediction method using data and the method of causal reasoning, we discuss the visualization method. Furthermore, students learn not only numerical data but also how to handle text data. At the same time, students also learn how to use R, which is free statistical software, in a practical form.

The goals of this lecture are (1) understanding the basic concepts of prediction and causal reasoning, (2) understanding how to visualize results using R, and (3) understanding how to visualize character data.

Class Schedule

Class 1 Guidance

Class 2 Prediction with data and visualization 1

Class 3 Prediction with data and visualization 2

Class 4 Causal inference with data and visualization 1

Class 5 Causal inference with data and visualization 2

Class 6 Documentation of text data 1

Class 7 Documentation of text data 2

Class 8 Summary

Text / Reference Books, etc.:

Imai, K. (2018). Quantitative social science: An introduction. Princeton University Press.

Grading Method:

Evaluation is made by contribution to the class, class reports and final report:

Criteria:

- Understanding fundamental statistical concepts necessary for causal inference, prediction, and text analysis
- Ability to make graphical presentations with R.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 環境原論 A	Subject Name in English: Principles of Environment A	Credits: 1	Instructor: Kusuda Tetsuya
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Through understanding of nature of current environmental issues, it acquires the ability to comprehend fundamental elements causes of environmental elements and their interrelationships. With the ability, students further develop intellectual foundation and comprehensive usage skill for solving not only currently serious environmental problems but also addressing signals that would potentially become extremely serious problems in the future.

Class Schedule

Class 1 Nature of environmental issues

Class 2 Structure and elements of the environment

Class 3 Interrelationship of the environmental elements: human and technology

Class 4 Interrelationship of the environmental elements: economy and nature

Class 5 Interrelationship of the environmental elements: economy and society

Class 6 Interrelationship of the environmental elements: religion and view of nature

Class 7 Interrelationship of the environmental elements: local system and global system

Class 8 Summary

Text / Reference Books, etc.:

Holdouts and additional materials provided in digital files via cloud system.

Textbooks and references are given in the lecture.

Grading Method:

Evaluations is made by class reports (40%) and final examination (60%)

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 環境原論 B	Subject Name in English: Principles of Environment B	Credits: 1	Instructor: Kusuda Tetsuya
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

The main environmental issues to be solved from now to the future are for a sustainable society. This is not a problem that has already become apparent, but it may be a major problem in the future. The aim of the lecture is to learn the methodological framework that makes it possible to globally apply respective methods related to individuals, policy, economy, society, and technology for setting and achieving the goals required to solve this problem.

Class Schedule

Class 1 What is sustainable society?

Class 2 Conditions for sustainable society

Class 3 Avoidance of collapse of sustainable society

Class 4 Intergenerational ethics and social capital

Class 5 Technology and strong sustainability

Class 6 Information sharing and usage

Class 7 Methodology for decision making and governance

Class 8 Summary

Text / Reference Books, etc.:

Holdouts and additional materials provided in digital files via cloud system.

Textbooks and references are given in the lecture.

Grading Method:

Evaluations is made by class reports (40%) and final examination (60%)

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: リサーチメソッド	Subject Name in English: Research Method	Credits: 2	Instructor: ISLAM MOINUL
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

The course introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches. Topics to be covered in detail include sampling, surveying, interviewing, case study analysis, focus groups, interviewing and analyzing and presenting data.

At the end of this course, students should be able to define research; explain and apply research terms; describe the research process and the principle activities, skills and ethics associated with the research process. Students should be able to assess and critique a published journal article that uses one of the primary research methods in the field. They can construct an effective questionnaire that employs several types of survey questions. Finally, they can construct an effective research proposal.

Class Schedule

1st Course overview: what is research?
2nd Literature reviews and data base searches
3rd Formative writing task
4th Research ethics
5th Theoretical approaches
6th Midterm presentation
7th Qualitative methods
8th Quantitative methods 1
9th Quantitative methods 2
10th Research analysis
11th Journal work
12th How to write up a research project
13th Verbal presentations on research proposals
14th Presentation of journal paper 1(Final Presentation)
15th Presentation of journal paper (2) (Final Presentation)

Text / Reference Books, etc.:

1. Cargill, M., & O'Connor, P. (2013). Writing scientific research articles: Strategy and steps. John Wiley & Sons.
2. Ethridge, D. (2004). Research methodology in applied economics: organizing, planning, and conducting economic research. Blackwell publishing.
3. Kothari, C. R. (2004). Research methodology: Methods and techniques. New Age International.

Grading Method:

Evaluation is mad by (1) In class quiz (50%), Mid-term presentation (20%) and Final presentation (30%). Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 持続可能な発展論基礎	Subject Name in English: Introduction to Sustainable Development	Credits: 2	Instructor: Kaneko Shinji
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

The lecture follows the book by Jeffrey D. Sachs, The Age of Sustainable Development, as a commonly designated textbook by the Joint International Master's Degree Program in Sustainable Development, and students comprehensively learn fundamental knowledge and arguments related to sustainable development and develop the ability to discuss with various viewpoints on important developments of the concepts of sustainable development.

Class Schedule

Class 1 Introduction to sustainable development
Class 2 An unequal world
Class 3 A brief history of economic development
Class 4 Why some countries developed while others stayed poor
Class 5 Ending extreme poverty
Class 6 Planetary boundaries
Class 7 Social inclusion
Class 8 Education for all
Class 9 Health for all
Class 10 Food security
Class 11 Resilient cities
Class 12 Climate Change
Class 13 Saving biodiversity and protecting ecosystem services
Class 14 Sustainable development goals
Class 15 Summary
Final examination

Text / Reference Books, etc.:

Jeffrey D. Sachs (2015):The Age of Sustainable Development, Columbia University Press

Grading Method:

Evaluations is made by mid-term examination, final examination and contribution to the class.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Regional and Urban Engineering	Subject Name in English: Regional and Urban Engineering	Credits: 2	Instructor: Zhang Junyi
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

This subject allows students to learn urban planning theories and strategies, the life-oriented approach, analysis and evaluation methods for forming desirable regions and cities, consensus building and citizen participation and so on, via lecture and practice (including reading assignment). Students will further learn how to make use of the methodologies learnt by investigating and presenting regional and urban issues in developed and developing countries, and writing a report on proposals for resolving actual regional and urban issues.

Through the above tasks, students will be trained to become a regional and urban planning expert with the following abilities to identify and analyze issues.

1. To foster an issue-constructing ability for resolving regional and urban issues, by understanding the generation mechanisms of regional and urban issues and planning process.
2. To foster an issue-constructing ability for finding and recognizing major issues and collecting necessary information by understanding design methods of life-oriented behavioral surveys.
3. To foster an issue-analyzing ability for evaluating policy effects and predicting demands for regional and urban planning by understanding basic concepts of the life-oriented approach.
4. To foster an issue-analyzing ability for evaluating multiple planning options based on integrated regional and urban models and policy evaluation theories.

Class Schedule

1st class: Lecture on regional/urban problems and their impacts in developed and developing countries

2nd class: Lecture on national/regional/urban planning and population migration

3rd class: Lecture on urban planning theories and sustainable urban forms

4th class: Lecture on basics of the life-oriented approach

5th–6th class: Practice by students (select one region/city, investigate and present its development issues)

7th–8th class: Practice by students (reading assignment of up-to-date literature)

9th–10th class: Lecture on survey and modeling methods of the life-oriented approach

11th–12th class: Practice by students (to learn various urban analysis methods)

13th class: Lecture on integrated regional and urban models and policy evaluation theories

14th class: Lecture on best-of-practice of regional and urban planning

15th–16th class: Term Presentation (present the contents of term reports)

Text / Reference Books, etc.:

To distribute lecture PDF files

Major Reading Lists:

[1] 20th-Century Sprawl: Highways and the Reshaping of the American Landscape, Oxford University Press; Gutfreund O.D. (2004)
[2] Cities of Tomorrow, Blackwell Publishing; Hall P. (2002)
[3] Creating Walkable Places: Compact Mixed0use Solutions, Urban Land Institute (2006)
[4] Community Disaster Recovery and Resiliency, CRC Press, Taylor & Francis Group; Miller D.S. and Rivera J.D. (2011)
[5] Cost-Benefit Analysis and the Environment, Nick Hanley and Clive L. Spash (2003), Edward Elgar.
[6] Guidelines for Developing Urban Transport Strategies, Institute of Highways & Transportation (1996), Stephen Austin, Hertford.
[7] Life-Oriented Behavioral Research for Urban Policy, Springe; Zhang J. (2017)
[8] Planning and Urban Design Standards, American Planning Association (2006), John Wiley & Sons
[9] Planning the Good Community: New Urbanism in Theory and Practice, Jill Grant (2006), Routledge.
[10] Public Place, Cambridge University Press; Carr S., Francis M., Rivlin L.G., and Stone A.M. (1992)
[11] Readings in Urban Theory, Wiley-Blackwell; Fainstein, S.S. and Campbell, S. (2011)
[12] Routledge Handbook of Transport in Asia; Zhang, J. & Feng, C.-M. (2018)
[13] Shopping Center Development Handbook, Urban Land Institute (2006)
[14] The Oxford Handbook of Megaproject Management, Oxford University Press; Bent Flyvbjerg (2017)
[15] The Sustainable Urban Development Reader, Routledge; Wheeler S.D. and Beatley T. (2004)
[16] The Behavioral Foundations of Public Policy, Princeton University Press; Elder Shafir (2013)
[17] Transport and Energy Research: A Behavioral Perspective, Elsevier; Zhang, J. (2019)
[18] Urban Transit Operations, Planning, and Economics, John Wiley & Son; Vukan R. Vuchic (2005)

Grading Method:

- Final term report (55%), Practice report (15%), Presentation (15%), Test per class (15%)
- S (Excellent) [90, 100], A (Superior) [80, 90), B (Good) [70, 80), C (Fair) [60, 70), D (Fail) (60, 0]

Subject Name: Fundamentals of Survey Methodology	Subject Name in English: Fundamentals of Survey Methodology	Credits: 2	Instructor: Chikaraishi Makoto
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

This is an introductory course of survey methodology, including data collection techniques, survey design, post-processing of data, and basic data analysis techniques. Concretely, students will acquire knowledge and skills on missing data handling methods, stated preference survey methods, contingent valuation methods, sampling design, and program evaluation methods, together with the understanding of types of errors in surveys systematically. A survey trial and the analysis of collected survey data will be followed to develop the ability to implement knowledge and skills learned through this subject.

By taking this subject, students will develop the basic skills necessary for conducting research, in particular:

1. Acquire specialized knowledge to construct appropriate questionnaire items for hypothesis testing through understanding of survey design methods.

2. Acquire specialized knowledge to choose appropriate survey and analysis methods to obtain unbiased statistical inference on target population.

3. To develop the ability to find and solve problems through survey trial, the analysis of collected data, and presentation of the results.

Class Schedule

1 Introduction
2 Types of errors in surveys
3 Data collection methods
4 Stated choice experiment
5 Contingent valuation method
6 Target population, sampling frame, and sampling (1)
7 Target population, sampling frame, and sampling (2)
8 Nonresponse issue (1)
9 Nonresponse issue (2)
10 Survey trial (1)
11 Survey trial (2)
12 Program evaluation methods (1)
13 Program evaluation methods (2)
14 Final presentation (1)

15 Final presentation (2)
Text / Reference Books, etc.: Handouts will be distributed. 1. Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., Tourangeau, R. (2004) Survey Methodology, John Wiley & Sons. 2. Fowler, F. (2013) Survey Research Methods, Sage Publications.
Grading Method: Grade will be evaluated by the following criteria: 50% --- Small exam (or homework) given in every lecture 50% --- Final presentation and report Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Numerical Environmental Impact Assessment I	Subject Name in English: Numerical Environmental Impact Assessment I	Credits: 2	Instructor: Lee Hansoo
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Learn about environmental impact assessment (air pollution, water quality problem, circulation of a reservoir) using numerical models and numerical calculations necessary to find countermeasures for disaster problems (storm surge and waves due to tropical cyclones, tsunami due to underwater earthquake, flood and inundation due to heavy rainfall, and so on). In the class, we will introduce basic theories such as differential equations, boundary value problems, finite differences, and continuity equation that are fundamental to fluid flow, and momentum equations, and practice weather prediction using numerical models.

As a result, students will learn the basic principles and ability of environmental impact assessment technology and disaster prevention / mitigation technology by numerical calculation. In particular,

1. Develop problem understanding ability to fundamentally solve a given problem by understanding processes related to environmental problems and disasters.
2. Develop the problem structure by acquiring the basic knowledge necessary for reproducing and predicting environmental problems and disasters, and the necessary numerical models.
3. Cultivate the task execution ability by acquiring the computing ability to utilize the numerical model.

Text / Reference Books, etc.:

1. Introduction of numerical environmental impact assessment
2-3. Differential equations and boundary value problems
4. flow
5-6. Continuity equation and the equation of momentum
7. Introduction of numerical model
8-9. Linux environment and shell script
10-12. Numerical weather prediction
13-14. Practice of numerical weather prediction: Tropical cyclone modelling
15. Summary

Text / Reference Books, etc.:

Distributing PPT materials for each lecture

Grading Method:

Presentation of modelling result (30%), participation (30%), report (40%) → total score will be evaluated based on the following criteria.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Geographic Information System Technology	Subject Name in English: Geographic Information System Technology	Credits: 2	Instructor: Zhang Runsen
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

In order to learn the methodology for spatial information processing and analysis in the field of urban and transport planning, environment, energy, agriculture, disaster prevention, etc., this course introduces the concepts and components of a geographic information system (GIS). It also teaches the essential skills of operating a functional GIS through introducing a few selected cases of GIS application in different disciplines. Expected learning outcomes are as follows: (1) to understand spatial data properties and structure; (2) to learn basic knowledges of GIS; (3) to learn how to process the spatial information by employing GIS; and (4) to acquire skills in spatial data modelling using GIS.

Class Schedule

Lesson 1: Introduction
Lesson 2: Basics of spatial data and GIS
Lesson 3: Introduction to GIS : Creation of thematic maps
Lesson 4: Spatial search
Lesson 5: Vector analysis 1
Lesson 6: Vector analysis 2
Lesson 7: Raster analysis 1
Lesson 8: Raster analysis 2
Lesson 9: Model builder (handling big spatial data)
Lesson 10: Spatial data compilation
Lesson 11: Network model analysis
Lesson 12: Spatial statistics/spatial interpolation
Lesson 13: 3D Analyst
Lesson 14: Case study
Lesson 15: Summary

Text / Reference Books, etc.:

Basic materials for the course will be distributed by the lecturer when required.

Grading Method:

Final score will be evaluated based on the report (70%), and small quiz for each lecture (30%).
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Basics in Economic Sciences	Instructor: Gawel, Eric Schnabl, Gunther Dornberger, Utz	
Credits: 5, (10ECTS)	Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

The subject contributes to creating a common level of knowledge in the field of economic sciences with regard to sustainability. Due to the non-consecutive and interdisciplinary character of the program, the alignment of knowledge standards is of particular importance.

The lecture "Sustainable Economics" introduces the basic concepts of micro and macroeconomics (market equilibrium, consumer preferences, theory of the firm, and economic policy objectives) while focusing on the effects of economic activities on sustainability (externalities, common and public goods, path dependency etc.).

The lecture "International Finance" covers exchange rate theory, international financial markets, and foreign exchange policy. Macroeconomic models (in particular the IS-LM model) are presented together with their implications for state intervention in the short and medium-term.

The seminar "Promotion of Small and Medium-Sized Enterprises" presents the current scientific discussion over concepts for the promotion of SMEs, with a focus on the integration of SMEs into the global value chain (GVC) and the internationalization of SMEs.

The objectives of the course are as follows.

Students are familiar with the fundamental schools of thought and theories in micro and macroeconomics, and can take into account actors' economic rationality and their interdependence, as well as the impacts of economic policies when analyzing sustainability issues, or when working out proposals for solutions. Students are able to reflect on sustainability issues, in particular the use of environmental resources, with the help of economic concepts such as resource scarcity, utility and profit maximization, and economic growth or welfare. They can analyze international financial markets and foreign exchange policies, and anticipate the impacts of economic policies. In addition, they can critically deal with the current concepts and strategies for the promotion of small and medium-sized enterprises (SMEs) and reflect on their feasibility.

Subject of Components:

Sustainable Economics (2 hours/week)

International Finance (2 hours/week)

Value Chain Management / Internationalization of SMEs (2 hours/week)

Grading Method:

Written exam

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Basics in Social Sciences – International Studies	Instructor: Engel, Ulf Rietdorf, Ute	
Credits: 5, (10ECTS)	Lesson Style: Lecture, Seminar	Teaching Style: Omnibus

Class Objectives / Class Outline

This lecture gives an introduction into the fields of global studies and international studies. At the beginning an overview on the study of traditional globalisation research as it has developed in the social sciences is given. Then three alternative perspectives are introduced that allow to decentre this conventional wisdom: critical area studies, post-colonial reasoning as well as new political geography. The potential of these perspectives is then discussed with a view to cases studies, including the rise of the so-called BRICS (Brazil, Russia, India, China and South Africa) – with an emphasis on the role of China in Africa – , global climate change politics, the fracturing of the Arab world, etc.

Subject of Components:

International Studies (Lecture) (2 hours/week)

International Studies (Exercise) (2 hours/week)

Development Economics (Seminar) (2hours/week)

Grading Method:

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Basics in Sustainable Development	Instructor: Bruckner, Thomas Nissen, Sylke Holländer, Robert Klauer, Bernd	
Credits: 5, (10ECTS)	Lesson Style: Lecture, Seminar	Teaching Style: Omnibus

Class Objectives / Class Outline

The course presents basics aspects of sustainability and their implications for global climate protection as well as for the corporate business and socio-urban context. At the same time methodologies form social sciences, from the model-based integrated assessment and from the corporate sustainability management will be provided.

Model-based Integrated Assessments (IA) attempt to provide a coherent mathematical framework for analyzing the complex cause-effect relationships that connect socio-economic activity and climate impacts. The course presents core elements and various application schemes.

Problems and tasks of human behaviour can be well examined by example of spatially confined areas of cities. The seminar presents an overview of urban studies and developments, of specific topics like segregation and suburbanisation and recent trends in city management. In this context sustainability aspects will be dealt with in socially as well as politically set urban environments. Sustainability in the private sector can be referred to as safeguarding societal and material resources. The course gives an overview of sustainability aspects in the corporate business environment, of basic principles, management instruments and mechanisms, environmental impacts and important supranational and national laws and regulations.

Subject of Components:

Integrated Assessment of global Climate Protection Strategies (2 hours/week)

Urban Geography, Sociology and Governance (2 hours/week)

Sustainability and Corporate Environmental Management / Theories of Sustainability (2 hours/week)

Grading Method:

Written exam (50%)

Seminar paper (50%)

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Environmental Management	Subject Name in English: Environmental Management	Credits: 2	Instructor: Lee Hansoo, Fujiwara Akimasa, Zhang Junyi, Kubota Tetsu, Chikaraishi Makoto, Tran Dang Xuan, Hosaka Tetsuro
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

In developing countries, economic development and environmental protections are inevitable themes to be tackled together in addition to increasing risks to natural hazards. In this lecture,

This lecture systematically introduces Japan's environmental development experience with the aim of providing practical knowledge that contributes to the realization of environmentally sustainable development in developing countries. Specifically, based on the historical transition of Japan's development and environmental issues, the Japanese development and modernization will be introduced in four areas: “city and transportation”, “energy”, “risk management” and “biological production”. As a result, students will acquire the abilities for problem understanding, problem composition, and problem solving in four fields in a given environment. In particular,

1. To develop multi-disciplinary and interdisciplinary problem analysis ability for various problems in four fields.
2. To develop problem-solving ability that can provide appropriate technologies and proposals in line with the found problems.
3. To develop problem-solving skills that can be used to propose sustainable development strategies to solve problems in developing countries.
4. Develop communication skills by proposing problem-solving solutions in cooperation with members from different fields.

Class Schedule

1. Japan's economic growth and development technology (Lee)
2. Reconstruction process of Hiroshima City (Fujiwara)
3. Historical evolution of development technology : I) Transportation infrastructure development (Fujiwara)
4. Historical evolution of development technology : II)National, regional and urban development (Zhang)
5. Group discussion I (Lee)
6. Historical evolution of development technology : III) Architectural development (Kubota)
7. Historical evolution of development technology : IV) Natural hazard and disaster prevention (Lee)
8. Group work interim presentation (Lee)

9. Historical evolution of development technology：V) Environmental risk (Chikaraishi)
10. Historical evolution of development technology：VI) Environmental assessment of ecosystem and establishment of sustainable agriculture (TRAN DANG XUAN)
11. Group discussion II (Lee)
12. Historical evolution of development technology：VII)Environmental management in forest ecosystem (natural / artificial), agricultural ecosystem, urban ecosystem (Hosaka)
13. Hiroshima City field visit (Fujiwara, Lee)
14. Human resource development (Fujiwara)
15. Group work final presentation (All instructors)

Text / Reference Books, etc.:

Distributing PPT materials for each lecture

Grading Method:

Presentation (30%), small quiz for every lecture (20%), student participation (30%), reports (20%)

→ total score will be evaluated based on the following criteria.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Development Technology	Subject Name in English: Development Technology	Credits: 4	Instructor: Tran Dang Xuan, Zhang Junyi, Zhang Rusen, Kubota Tetsu, Lee Hansoo, Hosaka Tetsuro, Chikaraishi Makoto, Kashima Saori
		Lesson type Lecture and Seminar	Teaching style : Omnibus

Class Objectives / Class Outline

In this lecture, technologies necessary for realizing environmentally sustainable development in developing countries are divided into four fields: urban and traffic engineering, energy technology, biological production technology, and risk management technology. Firstly, basic theories and technologies in each field are outlined, and examples of application of theories and technologies are introduced. Secondly, through group work, students will learn specific issues related to environmentally sustainable development in developing countries, propose solutions, and study how to apply the acquired theories and techniques. Students will develop the professional skills and they can logically think about how various development technologies contribute to environmentally sustainable development from a cross-sectoral perspective.

Class Schedule

1st Guidance (Tran Dang Xuan)
2nd Urban / Traffic Engineering: Coordination of Regional / City / Transport Infrastructure (Zhang Junyi)
3rd Environment and Health (Kashima)
4th Interdisciplinary Technology (Zhang Rusen)
5th Architecture Energy Saving Technology (Kubota)
6th Earth System Science and its Modeling Technology (Lee)
7th Agricultural Production Technology (Tran Dang Xuan)
8th Biodiversity Conservation and Ecosystem Management Method (Hosaka)
9th Risk Management Technology for Climate Change (Chikaraishi)
10th Review on previous presentations of students (Tran Dang Xuan)
11th Interim presentation (All instructors)
12th Group Work (All instructors)
13th Group Work (All instructors)
14th Group Work (All instructors)
15th Final Presentation (All instructors)

Text / Reference Books, etc.:

Distributing lecture PPT teaching materials and data on researches to reduce poverty reduction and climate change impacts in Cambodia and Bangladesh, respectively

Grading Method:

Evaluation is based on the overall score of test (30%), report (30%), and final presentation (40%)
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Transportation Engineering	Subject Name in English: Transportation Engineering	Credits: 2	Instructor: Fujiwara Akimasa
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Students of this course will acquire a set of process including goal setting, survey, analysis, prediction and evaluation for transport infrastructure development, and obtain its related knowledges and skills. To achieve this objective, the course will lecture the fundamentals of transport infrastructure project, transport planning, and transport policy as the following topics shown in class schedule.

After completing the whole course work, students will learn to be able to demonstrate competencies in composing and analyzing problems of the above fundamentals as an expert. Concretely,

1. Competency in composing the problems to figure out the relationship between mas as an individual and society as a whole from the viewpoints of different sciences by understanding the process of transport infrastructure development.
2. Competency in composing the problems to collect the necessary information and identify the specific questions by learning the role and methodology of transport survey.
3. Competency in analyzing the problems to design the conditions relevant to practical solutions of existing transport infrastructures by learning the principles of transport infrastructure planning and the concept of transport policies.
4. Competency in analyzing the problems to develop the value and judgement criteria and to evaluate multiple transport options based on the principle of transport infrastructure planning.

Class Schedule

1 Introduction and overview of transport statistics
The history of transport infrastructure development will be reviewed, and the current stage of the development and planning will be introduced.

2/3 Traffic flows and highway capacity
The fundamental theory of traffic flow and road capacity will be lectured.

4 Intersection design
The design methods of road intersections and traffic control will be explained.

5 Transportation Networks
The transport network theory and optimization methods will be lectured.

6/7 Road Planning in Neighborhood / Bicycle
The basic theory of road planning in neighborhood and bicycle planning will be explained by introducing the actual plans.

8/9 Public Transport Planning
Public transport planning (i.e. railway, bus, light rail transit, port and airport) will be introduced. Also the design methods will be explained.

10 Transportation Planning in Tourism
The issues of transport planning in tourism will be discussed.

11 Transportation Demand Management
Travel demand management measures to decrease congestion, traffic accidents and emission by appropriately managing the demand will be introduced.

12 Air Quality, Noise and Energy
The countermeasures on environmental issues caused by transport sectors, i.e. air pollution, noise and energy consumption, will be discussed. And also the evaluation method of environmental value will be lectured.
13 Intelligent Transport Systems
The recent development of ITS in US, Europe and Japan will be introduced. The advantages and disadvantages of ITS will be discussed.
14 Universal Design and barrier free in transport
The concept of universal design of infrastructure will be lectured. Also the global standard and actual problems will be discussed.
15 Final Examination

Text / Reference Books, etc.:
Lecturer will provide learning PPTs for each class.
Reading Lists:
1) Institute of Highways & Transportation (1996): Guidelines for Developing Urban Transport Strategies, Stephen Austin, Hertford.
2) Daganzo, C. (1997): Fundamentals of Transportation and Traffic Operations, Pergamon.
3) Papacostas, C. & P. Prevedouros (1993): Transportation Engineering and Planning, Prentice Hall.
4) Taylor, H., W. Young & P. Bonsall (1996): Understanding Traffic Systems: Data, Analysis and Presentation, Ashgate, pp.37-126.
5) Department of Transport (1994): Traffic Calming in Practice, Landor Publishing.
6) Hass-Klau, Carmen (1990): The pedestrian and city traffic, Belhaven Press.
7) Rodney Tolley (2003): Sustainable transport planning for walking and cycling in urban environments, Cambridge Wodhead.
8) White, P. (1995): Public Transport and Its Planning, Management and Operation, UCL Press.
9) Iles, R. (2005): Public Transport in Developing Countries, Elsevier.
10) Hensher, D. et al.(2003): Handbook of Transport and the Environment, Elsevier.
11) Banister, D. (2005): Unsustainable Transport: City transport in the new country, Routledge.
12) Hanson, S. (1995): The Geography of Urban Transportation, The Guilford Press, pp.435-469.
13) Risto Näätänen and Heikki Summala (1976): Road-user Behavior and Traffic Accidents, Elsevier.
14) Stough, R. (2001): Intelligent Transport Systems: Cases and Policies, Edward Eigar.
15) Wolfgang F. E. Preiser & Elaine Ostroff (2001): Universal Design Handbook, McGraw-Hill Professional.

Grading Method:
The final examination (report): 70%, Each mini quiz: 30%
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Transportation Planning	Subject Name in English: Transportation Planning	Credits: 2	Instructor: Fujiwara Akimasa
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

The course will teach the fundamental theory of transport survey and modeling for widely used travel demand forecasting. Students will experience a programming for model estimation by using exercise data and study the cause-effect relationship among transport, environment and quality of life trough interactive lectures and seminars.

Students will learn to be able to demonstrate competencies in composing and analyzing problems as an expert. Concretely,

1. Competency in composing the problems to figure out the social meaning of transport planning from the viewpoints of different sciences.
2. Competency in composing the problems identify problems based on scientific evidences after studying a methodology of transport survey designs.
3. Competency in analyzing the problems to predict demands for transport planning and policies by grasping the concept of travel behavior models.
4. Competency in analyzing the problems to evaluate multiple transport options based on cost-benefit analysis.

Class Schedule

<Theoretical module>

1-3. Transport survey design and big data

4. Travel demand forecasting

5-7. Travel behavior analysis

<Practical module>

8. Outline of transport planning project

9. Campus tour to figure out the existing problems

10-12. Group works

13-14. Presentation of achievement

15. Discussions

Text / Reference Books, etc.:

Lecturer will provide learning PPTs for each class.

Reading Lists:

－Harry D. Timmerman (1992): Urban transport planning: a developmental approach, Routledge.

－Stopher, P. & A. Meyburg (1975): Urban transportation modeling and planning,

Lexington Books
－Meyer, M. & E. Miller (1984): Urban transportation planning: a decision-oriented approach, McGraw-Hill.
－David Banister (2002), Transport Planning: Transport Development and Sustainability, Spon Press.
－Richardson, A. et al (1995): Survey Methods for Transport Planning, Eucalyptus Press.
－Pearmain, P. et al (1991): Stated Preference Techniques –A Guide to Practice, Steer Davies Gleave & Hague Consulting Group.
－Louviere, J. et al (2000): Stated Choice Analysis –Analysis and Application, Cambridge University Press.
－Ortuzar, J. & L. Willumsen (1994): Modelling Transport, John Wiley & Sons.
－TRB (2005): Introduction of Travel Demand Forecasting, CD-ROM.
－Sheffy, Y. (1985): Urban Transportation Networks, Prentice-Hall.
－Ben-Akiva M. & S.Lerman (1985): Discrete Choice Analysis, The MIT Press.
－Hensher D. & K. Button (2000): Handbook of Transport Modelling, Pergamon.
－Koppelman, F. and C. Bhat (2006), A Self Instructing Course in Mode Choice Modeling: Multinomial and Nested Logit Models, Prepared For U.S. Department of Transportation Federal Transit Administration.
－Oppenheim,N. (1995): Urban Travel Demand Modeling, John Wiley & Sons.
－ Kitamura, R. (2005): Simulation Approaches In Transportation Analysis: Recent Advances and Challenges, Springer
－Hoffman, A. (2007): Carbon strategies: How leading companies are reducing their climate change footprint, ERB Institute, University of Michigan.
－Archer, D. (2007): Global warming, Blackwell.
－Bolin, B. (2007): A history of the science and politics of climate change, Cambridge.
－Harrington, J. (2008): The climate diet- How you can cut carbon, cut costs, and save the planet, Earthscan.
－Foxon, T., Kohler J. and Oughton C. (2008): Innovation for a low carbon Economy, Edward Elgar.

Grading Method:

Reports: 80% (=20%*4), Each mini quiz: 20%

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Tourism Policy	Subject Name in English: Tourism Policy	Credits: 2	Instructor: Zhang Junyi
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

This subject allows students to understand the trends and issues of tourism development (mainly in Asia) and learn policy making methods for realizing sustainable tourism, via lecture and practice (including reading assignment). Students will further learn how to make use of the methodologies learnt by investigating and presenting tourism development issues in Asia, and writing a report on proposals for resolving actual regional and urban issues.

Through the above tasks, students will be trained to become a tourism policy making expert with the following abilities to identify and analyze issues.

1. To foster an issue-constructing ability for resolving tourism issues, by understanding the generation mechanisms of tourism issues and policy making process.
2. To foster an issue-constructing ability for finding and recognizing major issues and collecting necessary information by understanding design methods of tourist behavior surveys.
3. To foster an issue-analyzing ability for evaluating policy effects and predicting demands for tourism planning by understanding basic concepts of tourist behavior theories.
4. To foster an issue-analyzing ability for evaluating multiple planning options based on integrated tourism models and policy evaluation theories.

Class Schedule

1st class: Lecture on tourism issues and their impacts in developed and developing countries

2nd class: Lecture on tourism resources and forms

3rd class: Lecture on tourism policy making methods

4th class: Lecture on basics of tourist behavior theories

5th–6th class: Practice by students (select one tourist destination, investigate and present its development issues)

7th–8th class: Practice by students (reading assignment of up-to-date literature on tourism policy)

9th–10th class: Lecture on survey and modeling methods of tourist behaviors

11th–12th class: Practice by students (to learn various analysis methods for tourism policy)

13th class: Lecture on destination management methods and policy evaluation method

14th class: Lecture on tourism marketing

15th–16th class: Term Presentation (present the contents of term reports)

Text / Reference Books, etc.:

To distribute lecture PDF files

Major Reading Lists:

[1] Asia on Tour: Exploring the Rise of Asian Tourism, Routledge; Winter T., Teo P., Chang T.C. (2009)

[2] Consumer Behavior in Travel and Tourism, The HawHospitality Press; Pizam A. and Mansfeld Y. (2000)

[3] Destination Recommendation Systems: Behavioral Foundation and Applications, Cabi Publishing; Fesenmaier D.R., Wober K.W., and Werthner H. (2006)

[4] Ecotourism, Routledge; Fennell D. (2008)

[5] Environment and Tourism, Routledge; Holden A. (2008)

[6] Handbook of Tourist Behavior, Routledge; Kozak M. and Decrop A. (2009)

[7] Leisure and Recreation Management, Routledge; Torklidsen G. 2005)

[8] Leisure and Tourism Policy and Planning, Cabi Publishing; Veal A.J. (2002)

[9] Life-Oriented Behavioral Research for Urban Policy, Springe; Zhang J. (2017)

[10] Routledge Handbook of Transport in Asia; Zhang, J. & Feng, C.-M. (2018)

[11] Service Science, Wiley; Daskin M.S. (2010)

[12] Successful Tourism Marketing: A Practical Handbook, Kogan Page; Briggs S. (2001)

[13] The Behavioral Foundations of Public Policy, Princeton University Press; Elder Shafir (2013)

[14] Tourism and Development in the Developing World, Routledge; Telfer D.J. and Sharpley R. (2008)

[15] Tourism Marketing for Cities and Towns: Using Branding and Events to Attract Tourists, Elsevier; Kolb B.M. 2006)

[16] Tourism Policy: The Next Millennium, Sagamore Publishing; Edgell, D.L. (1999)

[17] Tourism and Regional Development, Ashgate; Giaoutzi M. and Nijkamp P. (2006)

[18] Transport and Energy Research: A Behavioral Perspective, Elsevier; Zhang, J. (2019)

Grading Method:

- Final term report (55%), Practice report (15%), Presentation (15%), Test per class (15%)
- S (Excellent) [90, 100], A (Superior) [80, 90), B (Good) [70, 80), C (Fair) [60, 70), D (Fail) (60, 0]

Subject Name: Risk Management Technology	Subject Name in English: Risk Management Technology	Credits: 2	Instructor: Chikaraishi Makoto
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Climate change is surely one of the biggest global risks for the future. While the knowledge of natural science plays central roles in evaluating the risk of climate change, in the management process, we also have to deeply understand interactions between natural environment and human activities, and how people perceive the risk for a better public policy decision-making.

Given the above background, this course has three specific aims: (1) to review and critically examine a set of problems which involve risks (i.e., the potentials of losing something of values), (2) to help students learn how to conduct risk analysis and assessment, and (3) to encourage students to understand risk management theories and practices under complex and uncertain natural and human systems.

By taking this subject, students will develop the basic skills necessary for conducting research, in particular:

1. Develop the ability to identify and structure problems of climate change risks from diversified perspectives through understanding of the effect of climate adaptation and mitigation including adverse effects.
2. Acquire specialized knowledge and skills on risk analysis, risk evaluation, sensitivity analysis, and uncertainty analysis to solve the identified problems.
3. To develop the ability to find and structure problems through looking at a number of existing cases.

Class Schedule

1. Introduction
2. Climate change-related risks
3. Quantification of risks (1)
4. Quantification of risks (2)
5. Risk-benefit analysis (1)
6. Risk-benefit analysis (2)
7. What is uncertainty?
8. Uncertainty and sensitivity analysis
9. Risk perception

10. Decision making under risk and uncertainty (1)
11. Decision making under risk and uncertainty (2)
12. Risk management (1)
13. Risk management (2)
14. Learning through a case (1)
15. Learning through a case (2)

Text / Reference Books, etc.:
Handouts will be distributed.

1.Glickman, T.S. and Gough, M. (1990) Readings in Risk, Resources for the Future, New York.
2.Morgan, G., Henrion, M. (1990) Uncertainty: A Guide to Dealing with Uncertainty in Quantitative Risk and Policy Analysis, New York, Cambridge University Press.
3.ICPP (2014) Climate Change 2014: Synthesis Report, Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp [URL: http://www.ipcc.ch/report/ar5/syr/].
4.Hastie, R., Dawes, R.M. (2010) Rational Choice in an Uncertain World: The Psychology of Judgment and Decision Making, 2nd Edition, Sage.

Grading Method:
Three reports (Report 1: 15%; Report 2: 15%; Report 3: 30%)
Small exam and active participation in class discussions (40%)
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Sustainable Architecture A	Subject Name in English: Sustainable Architecture A	Credits: 2	Instructor: Kubota Tetsu
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Today, approximately 35-40% of the world energy is consumed in Asia, and this percentage is expected to rise further. Energy consumption has increased particularly in the residential sector in line with the rapid rise of the middle class. The majority of growing Asian cities are located in hot and humid climate regions. There is an urgent challenge for designers to provide healthy and comfortable indoor environments for occupants without consuming non-renewable energy and resources excessively in growing tropical Asian cities. This course aims to equip students with fundamental theory and techniques for achieving sustainable architecture in developing Asia. By the end of this course, each student should be able to:

1. Understand the present status in the housing sector in growing cities of Southeast Asia,
2. Explore the traditional passive techniques embedded in vernacular architecture in Asia,
3. Obtain basic knowledge of building techniques for sustainability, and
4. Explore the latest advances in sustainable architecture through the review of actual practices.

Class Schedule

1. Introduction, Present state in Asia
2 - 3. Vernacular architecture in Asia
4. Thermal comfort
5. Thermal adaptation
6. Case study 1 - Vernacular architecture
7. Thermal environment of buildings
8. Case study 2 - Modern houses
9 - 10. Passive cooling
11. Case study 3 - Non residential
12. Introduction of Energy-saving and low-carbon projects
13 - 14. Group Discussion: Sustainable architecture towards 2030
15. Group Presentation

Summary

Text / Reference Books, etc.:

PPT files and Lecture notes will be distributed.

Reading Lists:

[1] ASHRAE, 2009 ASHRAE Handbook, Fundamentals, SI Edition, ASHRAE; 2009.
[2] Cunningham, W.P. et al. (2007) Environmental Science, A global concern, 9th ed. New York: McGraw-Hill.
[3] Emmanuel, M.R. (2005) An Urban Approach to Climate-Sensitive Design, Strategies for the Tropics, Spon Press, London.
[4] Evans, M. (1980) Housing, Climate and Comfort, John Willey & Sons, Inc.
[5] Fanger, P.O., Thermal Comfort: Analysis and Applications in Environmental Engineering. New York: McGraw-Hill Book Co, 1972.
[6] Gartland, L. (2008) Heat Island, Understanding and Mitigating Heat in Urban Areas, Earthscan, London.
[7] Givoni, B. (1998) Climate Consideration in Building and Urban Design, John Willey & Sons, Inc.
[8] Kibert, C.J. (2008) Sustainable Construction: Green building design and delivery, 2nd ed., John Willey & Sons, Inc.
[9] Lechner, N. (2009) Heating, Cooling, Lighting: Sustainable design methods for architects, 3rd ed., John Willey & Sons, Inc.
[10] McIntyre, D. A., Indoor Climate. London: Applied Science Publishers Ltd, 1980.
[11] McMullan R., Environmental Science in Building, 5th ed. New York: Palgrave Macmillan; 2002.
[12] Moore, F. (1993) Environmental Control Systems: Heating Cooling Lighting, McGraw-Hill, Inc.
[13] Parsons, K., Human Thermal Environments, The effects of hot, moderate and cold environments on human health, comfort and performance, Taylor & Francis; 2003.
[14] Szokolay, S.V. (2008) Introduction to Architectural Science: The Basis of Sustainable Design, 2nd ed., Elsevier Ltd.
[15] Watson, D. et al. (1983) Climatic Design, McGraw-Hill, Inc.
[16] Wong, N.H. et al (2009) Tropical Urban Heat Islands; Climate, Buildings and Greenery, Taylor & Francis, London.

Grading Method:

Course evaluation: Test (30%), Presentation (50%), Mini tests (20%)

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Sustainable Architecture B	Subject Name in English: Sustainable Architecture B	Credits: 2	Instructor: Kubota Tetsu
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

One of the most effective ways to learn about sustainable architecture is to visit the sites and experience the actual environments. This course provides students with several opportunities to visit sustainable architecture in and around Higashi-Hiroshima. After each of the site visits, the students discuss the sustainable techniques that were seen in the examples. The results of the discussions are presented by the students afterwards. The practices that are going to be visited include not only modern buildings but also traditional houses.

Class Schedule

1. Introduction, Japanese climates, Traditional and modern Japanese houses in brief

[First Part]

2. Modern Japanese houses
3. Site Visit 1: Higashi-Hiroshima Housing Fair
4. Summary of Site Visit 1 and Plan for Site Visit 2
5 - 6. Site Visit 2
7. Group Discussion
8. Present the results of site visits in group

[Second Part]

9. Traditional Japanese houses
10. Site Visit 3: Former Ishii's residence
11. Summary of Site Visit 3 and Plan for Site Visit 4
12 - 13. Site Visit 4
14. Group Discussion
15. Present the results of site visits in group

Summary

Text / Reference Books, etc.:

Lecture notes and PPT files will be distributed.

Reading Lists:

[1] Emmanuel, M.R. (2005) An Urban Approach to Climate-Sensitive Design, Strategies for the Tropics, Spon Press, London.

[2] Evans, M. (1980) Housing, Climate and Comfort, John Willey & Sons, Inc.

[3] Fanger, P.O., Thermal Comfort: Analysis and Applications in Environmental Engineering. New York: McGraw-Hill Book Co, 1972.
[4] Gartland, L. (2008) Heat Island, Understanding and Mitigating Heat in Urban Areas, Earthscan, London.
[5] Givoni, B. (1998) Climate Consideration in Building and Urban Design, John Willey & Sons, Inc.
[6] Kibert, C.J. (2008) Sustainable Construction: Green building design and delivery, 2nd ed., John Willey & Sons, Inc.
[7] Lechner, N. (2009) Heating, Cooling, Lighting: Sustainable design methods for architects, 3rd ed., John Willey & Sons, Inc.
[8] McIntyre, D. A., Indoor Climate. London: Applied Science Publishers Ltd, 1980.
[9] McMullan R., Environmental Science in Building, 5th ed. New York: Palgrave Macmillan; 2002.
[10] Moore, F. (1993) Environmental Control Systems: Heating Cooling Lighting, McGraw-Hill, Inc.
[11] Parsons, K., Human Thermal Environments, The effects of hot, moderate and cold environments on human health, comfort and performance, Taylor & Francis; 2003.
[12] Szokolay, S.V. (2008) Introduction to Architectural Science: The Basis of Sustainable Design, 2nd ed., Elsevier Ltd.
[13] Watson, D. et al. (1983) Climatic Design, McGraw-Hill, Inc.
[14] Wong, N.H. et al (2009) Tropical Urban Heat Islands; Climate, Buildings and Greenery, Taylor & Francis, London.－Harry D. Timmerman (1992): Urban transport planning: a developmental approach, Routledge.

Grading Method:
Course evaluation: Presentations (80%), Mini tests (20%)
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Energy Science and Technology	Subject Name in English: Energy Science and Technology	Credits: 2	Instructor: Lee Hansoo
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Promoting the use of renewable energy is indispensable in order to achieve environmental protection and make sustainable development.
In this class, lectures will be delivered on renewable energy technologies and their utilization, and discussions will be made on energy and society for sustainable development.
Lectures on solar power, nuclear power, wind power, hydropower, ocean energy, and biomass energy will be given as renewable energy resources. In particular,

1. To develop an understanding of the energy conversion process.
2. To develop the ability to propose appropriate renewable energy for the environment based on the understanding of renewable energy conversion process.
3. Based on the above, cultivate problem-solving skills that can propose a suitable renewable energy supply and demand strategy for sustainable development.

Class Schedule

1. Relationship between greenhouse gases and global warming
2. Energy conversion process
3. Solar power generation
4. Nuclear power generation
5. Wind-power generation
6. Hydropower generation
7. Ocean power generation
8. Biomass power generation
9. Energy and Society

10—11. Field excursion to a power plant
12—14. Student presentations
15. Summary

Text / Reference Books, etc.:
Distributing PPT materials for each lecture
Reading lists:
1) Andrews and Jelley (2013). Energy Science: principles, technologies and impacts, Oxford, 424p
2) Boeker and Grondelle (2011). Environmental Physics; Sustainable Energy and Climate Change, Wiley, 429p
3) Goldemberg (2012). Energy; What everyone needs to know, Oxford, 159p
4) Godfrey Boyle (2012). Renewable Energy: Power for a sustainable future, Oxford, 566p

Grading Method:
Presentation（30%）, small quiz for each lecture（20%）, student participation（30%）, report（20%）→ total score will be evaluated based on the following criteria
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Numerical Environmental Impact Assessment II	Subject Name in English: Numerical Environmental Impact Assessment II	Credits: 2	Instructor: Lee Hansoo
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Learn about environmental impact assessment (air pollution, water quality problem, circulation of a reservoir) using numerical models and numerical calculations necessary to find countermeasures for disaster problems (storm surge and waves due to tropical cyclones, tsunami due to underwater earthquake, flood and inundation due to heavy rainfall, and so on). In the class, we will introduce basic theories such as differential equations, boundary value problems, finite differences, and continuity equation that are fundamental to fluid flow, and momentum equations, and practice weather prediction using numerical models.

As a result, students will learn the basic principles and ability of environmental impact assessment technology and disaster prevention / mitigation technology by numerical calculation. In particular,

1. Develop problem understanding ability to fundamentally solve a given problem by understanding processes related to environmental problems and disasters.

2. Develop the problem structure by acquiring the basic knowledge necessary for reproducing and predicting environmental problems and disasters, and the necessary numerical models.

3. Cultivate the task execution ability by acquiring the computing ability to utilize the numerical model.

* In order to take numerical environmental impact assessment II, it is required to take the numerical environmental impact assessment I.

Class Schedule

1-2. Ocean and waves
3-6. Wave theory
7. Overview of numerical modelling of waves
8-9. Wind wave models
10. Linux environment and shell script
11-12. Storm surge modelling practice
13-14. Wind wave modelling practice.
15. Summary

Text / Reference Books, etc.:

Distributing PPT materials for each lecture

Grading Method:

Small quiz for each lecture（30%）, student participation（30%）, report（40%）→ Total score will be evaluated based on the following criteria

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Botany Resources for the Future	Subject Name in English: Botany Resources for the Future	Credits: 2	Instructor: Tran Dang Xuan
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

In this lecture, students will learn the botany resource and the potential application based on plant physiology. In addition, we will examine the methods for identifying and isolating genes and secondary metabolites related to the tolerant to salt damage, drought, high temperature, submergence, pests and weeds in crops for climate change. We aim to comprehensively understand the development of new agricultural pesticides from the secondary metabolites which is safer for human and environment.

Class Schedule

1st What is resource botany?
2nd Basic theory of plant physiology
3rd Basic theory of plant physiology
4th Basic theory of plant physiology
5th What are secondary metabolites?
6th Method for identification of secondary metabolites
7th Method for isolation of secondary metabolites
8th Drought tolerance of crops towards climate change
9th Salt tolerance of crops towards climate change
10th High temperature tolerance of crops towards climate change
11th Crop flooding tolerance towards climate change
12th Pest resistance of crops towards climate change
13th Weed tolerance of crops towards climate change
14th Breeding of new crop species resistant to climate change and development of novel pesticides
15th Summary, General Discussion

Text / Reference Books, etc.:

Distributing lecture PPT teaching materials and data on plant physiology, resource botany and climate change

Grading Method:

Evaluation is based on the overall score of test (30%), report (30%), and final presentation (40%)
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Environmental Monitoring	Subject Name in English: Environmental Monitoring	Credits: 2	Instructor: Tran Dang Xuan
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

In this lecture, students will learn how to identify chemical components that contaminate water and soil, especially heavy metals. In addition, lectures will be given for students to understand the use specialized analyzers (ion chromatography, ICP-MS, etc.) to identify and quantify chemical components and heavy metals. This lecture also provides knowledge on the negative effects of polluted chemical components, including heavy metals, on the environment and health.

Class Schedule

1st What is environmental monitoring?
2nd Heavy metal classification
3rd Adverse effect of heavy metals on the environment and health
4th Adverse effects of heavy metals on the environment and health
5th Classification of pollutants other than heavy metals
6th Effects of pollutants other than heavy metals on the environment and health
7th Effects of pollutants other than heavy metals on the environment and health
8th What is ion chromatography?
9th The use of ion chromatography
10th What is ICP-MS?
11th The use of ICP-MS
12th What is atomic absorption spectroscopy (AAS)?
13th The use of atomic absorption spectroscopy (AAS)
14th Applied technologies using plants to reduce the amount of heavy metals
15th Summary, General Discussion

Text / Reference Books, etc.:

Distributing lecture PPT teaching materials and data on ICP-MS, AAS, ion chromatography

Grading Method:

Evaluation is based on the overall score of test (30%), report (30%), and final presentation (40%)
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Biomass Energy Technology	Subject Name in English: Biomass Energy Technology	Credits: 2	Instructor: Tran Dang Xuan
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

In this lecture, students attending the lecture will study on the basic theory of biomass energy technology. The purpose is achieving the philosophy of blending bioethanol and biodiesel into fuels to reduce the amount of carbon dioxide and exhaust gas. In addition, in order to produce biofuels from crop residues, we will discuss the examples of fermentation technologies and methods for identifying and isolating genes related to the amount and sugar content of crop biomass. A comprehensive understanding of breeding and cultivation techniques is also lectured and discussed.

Class Schedule

1st What is biomass energy?

2nd Effects of carbon dioxide and exhaust gas on global warming

3rd Bioethanol production technology

4th Bioethanol production technology

5th Biodiesel production technology

6th Biodiesel production technology

7th Fermentation technology for biofuel production

8th Biofuel blending technology for fuel

9th crop for biofuel production

10th Identification of genes related to crop biomass

11th Isolation of genes related to crop biomass

12th Identification of genes related to crop sugar content

13th Isolation of genes related to crop sugar content

14th Breeding technology for crops with high biomass and sugar content

15th Summary, General Discussion

Text / Reference Books, etc.:

Distributing lecture PPT teaching materials and data on biomass, biofuels, crop genetic engineering and breeding

Grading Method:

Evaluation is based on the overall score of test (30%), report (30%), and final presentation (40%)
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Ecosystem Conservation and Management Science	Subject Name in English: Ecosystem Conservation and Management Science	Credits: 2	Instructor: Hosaka Tetsuro
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Ecosystem management and conservation is critical for sustainable development of human society. In this lecture, students will learn fundamental theories on basic ecology (e.g. population, community and ecosystem ecology) and theories on conservation ecology, one type of applied ecology. Then, students will learn applications of these theories to ecosystem management in social-ecological systems and discuss their advantages and limitations.

Class Schedule

Lesson1 What is "ecosystem"?
Lesson2 What is ecosystem management?
Lesson3 Theories of ecosystem management
Lesson4 Conservation of fragmented landscapes (1)
Lesson5 Conservation of fragmented landscapes (2)
Lesson6 Planning and management of nature protected areas (1)
Lesson7 Planning and management of nature protected areas (2)
Lesson8 Management of invasive alien species (1)
Lesson9 Management of invasive alien species (2)
Lesson10 Climate change and ecosystem management (1)
Lesson11 Climate change and ecosystem management (2)
Lesson12 Social-ecological systems (1)
Lesson 13 Social-ecological systems (2)
Lesson 14 Students' final presentation
Lesson 15 Students' final presentation

Text / Reference Books, etc.:

Lecture materials (handout and ppt slides) will be distributed
Mori (2012) Ecosystem management – toward a comprehensive conservation of ecosystems -, Kyoritsu-shuppan, Tokyo.

Grading Method:

Grade will be evaluated by the following criteria:
Small exam (or homework) given in every lecture (30%)
Active participation in discussion (30%)
Final presentation and report (40%)
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Management and Conservation of Ecosystems	Subject Name in English: Management and Conservation of Ecosystems	Credits: 2	Instructor: Hosaka Tetsuro
		Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

Our lives are supported by various ecosystem services provided by biological diversity such as genetic diversity, species diversity and landscape diversity. In this lecture, I will focus on basic theories of ecology including the mechanisms for creating and maintaining biodiversity, pattern of population dynamics and species interactions. Also, I will explain about the relationships between human livelihood and biological resources with introducing some theories and examples. Through this lecture, students will be able to obtain fundamental knowledge to develop sustainable methods and technologies for biological resource management.

Class Schedule

Lesson1 What is "Ecology"?
Lesson2 Commonness and diversity of organisms
Lesson3 Hierarchy of ecosystems
Lesson4 Theories of biological evolution
Lesson5 Interactions among individuals
Lesson6 Interactions among species
Lesson7 Structure and function of ecosystems
Lesson8 Ecosystems and human society
Lesson9 Forest ecosystems
Lesson10 Agricultural ecosystems
Lesson11 Urban ecosystems
Lesson12 Ecology and biological resource management (1)
Lesson13 Ecology and biological resource management (2)
Lesson14 Students' presentation
Lesson15 Students' presentation

Text / Reference Books, etc.:

Lecture materials (handout and ppt slides) will be distributed.

1) Ecological Society of Japan (2012) Introduction of Ecology, the second edition. Tokyo-kagaku-dojin, Tokyo.
2) Begon, M., Townsend, C. R. (2019) Ecology: From Individuals to Ecosystems. 5th edition. Wiley-Blackwell.

Grading Method:

Grade will be evaluated by the following criteria:

Small exam (or homework) given in every lecture (30%)
Active participation in discussion (30%)
Final presentation and report (40%)
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 演習 A	Subject Name in English: Seminar A	Credits: 2	Instructor: Kubota Tetsu, Zhang Junyi, Nishina Daisaku, Matsumura Yukihiko, Tsukai Makoto, Tran Dang Xuan, Hosaka Tetsuro, Lee Hansoo, Fujiwara Akimasa, Kashima Saori, Chikaraishi Makoto
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

To develop the ability to understand the differences in quality among papers in journals on international economic development, and to search and read high-quality papers. Students will learn the basics of summarizing and communicating research results through regular research progress reports and acquire the basic ability to critically examine and discuss other research reports.

Class Schedule

Class 1: Presentation on thesis research
Class 2: Presentation on thesis research
Class 3: Paper reading
Class 4: Presentation on thesis research
Class 5: Presentation on thesis research
Class 6: Paper reading
Class 7: Presentation on thesis research
Class 8: Presentation on thesis research
Class 9: Paper reading
Class 10: Presentation on thesis research
Class 11: Presentation on thesis research
Class 12: Paper reading
Class 13: Presentation on thesis research
Class 14: Presentation on thesis research
Class 15: Paper reading
Oral presentation of research progress

Text / Reference Books, etc.:

Handouts

Grading Method:

Active participation in discussion and presentation.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 演習 B	Subject Name in English: Seminar B	Credits: 2	Instructor: Kubota Tetsu, Zhang Junyi, Nishina Daisaku, Matsumura Yukihiko, Tsukai Makoto, Tran Dang Xuan, Hosaka Tetsuro, Lee Hansoo, Fujiwara Akimasa, Kashima Saori, Chikaraishi Makoto
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

To find high-level papers on international economic development and to develop critical reading skills. Students will learn how to summarize and communicate research results through regular research progress reports, and acquire the ability to critically examine and discuss other research reports.

Class Schedule

Class 1: Presentation on thesis research
Class 2: Presentation on thesis research
Class 3: Paper reading
Class 4: Presentation on thesis research
Class 5: Presentation on thesis research
Class 6: Paper reading
Class 7: Presentation on thesis research
Class 8: Presentation on thesis research
Class 9: Paper reading
Class 10: Presentation on thesis research
Class 11: Presentation on thesis research
Class 12: Paper reading
Class 13: Presentation on thesis research
Class 14: Presentation on thesis research
Class 15: Paper reading
Oral presentation of research progress

Text / Reference Books, etc.:

Handouts

Grading Method:

Active participation in discussion and presentation.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: フィールドワーク	Subject Name in English: Fieldwork	Credits: 2	Instructor: Kubota Tetsu, Zhang Junyi, Nishina Daisaku, Matsumura Yukihiko, Tsukai Makoto, Tran Dang Xuan, Hosaka Tetsuro, Lee Hansoo, Fujiwara Akimasa, Kashima Saori, Chikaraishi Makoto
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

In this course, fieldwork is defined as research activities conducted in domestic and overseas fields. This lecture is based on the fieldwork implementation plan, including study purpose, period, region, and survey content, as well as other logistical issues such as contact information. These must be created by students under the guidance of the supervisor.

Class Schedule

Fieldwork will be conducted over 2 weeks (60 hours of actual work). The Academic Affairs Committee will review the fieldwork implementation plan (implementing agency, region, period, training content, contact information, supervisor's approval, etc.) in advance and obtain permission for implementation. After the implementation, the Academic Affairs Committee will recognize credits and evaluate grades based on the implementation report and the supervisor's evaluation report.

Text / Reference Books, etc.:

Handouts

Grading Method:

Comprehensive evaluation based on fieldwork implementation plan as mentioned above, implementation report and supervisor evaluation report.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: グローバルインターンシップ	Subject Name in English: Global Internship	Credits: 2	Instructor: Kubota Tetsu, Zhang Junyi, Nishina Daisaku, Matsumura Yukihiko, Tsukai Makoto, Tran Dang Xuan, Hosaka Tetsuro, Lee Hansoo, Fujiwara Akimasa, Kashima Saori, Chikaraishi Makoto
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

This is a practical training course that aims to expand students' ability to solve social and practical issues, by developing practical skills and career options. Through internships with domestic and foreign private companies, international organizations, governmental organizations, non-profit organizations, etc., students learn about the management of companies and organizations, while contributing to the society.

Class Schedule

The training period is for more than 2 weeks (60 hours of actual work). The Academic Affairs Committee will review the internship implementation plan (the executing agency, region, period, training content, contact information, supervisor's approval, etc.) in advance and obtain permission for implementation. After implementation, the Academic Affairs Committee will recognize credits and evaluate grades based on the implementation report and the evaluation report of the instructor.

Text / Reference Books, etc.:

Handouts

Grading Method:

Comprehensive evaluation based on the intership implementation plan as mentioned above, implementation report, and evaluation report of the instructor.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Developing Designing Ability	Subject Name in English: Developing Designing Ability	Credits: 2	Instructor: Fujiwara Akimasa, Lee Hansoo
		Lesson Style: Seminar, Lecture	Teaching Style: Omnibus, Collaboration(part)

Class Objectives / Class Outline

This course employs a practical of debate so as to go through the process of interpreting and discussing internship experiences in the field by relating multidimensional knowledge critically to each other. The expected educational outcomes for this course are set as follows:

(1) To understand competency required for future professional specialists and the background behind it. And to know what debating skill is.

(2) Through preparation for debate exercise, students will be able to develop problem processing ability in the face of an issue, which consists of several steps such as grasping key problems of the issue, coming up with multiple solutions for them, and utilizing relevant knowledge and skills for it.

(3) Through a practical debating exercise, students will be able to improve abilities to grasp a topic of debate from various aspects as well as to consider possible arguments from each of both antithetical standpoints, and then to address them logically according to the standpoint.

Class Schedule

1. Introduction: Background, objectives, and outline of the course will be explained here. By demonstrating the actual activities of debate and problem mining seminar in the previous year, fascinating aspect of debate and significance of case method will be presented. It will also discuss the competency required for professional specialists under the rapid internationalization.
2. Outline of Debate 1: Outline of debate and required skills for debate, such as logical thinking and communication skill, etc., will be introduced and discussed.
3. Outline of Debate 2: Outline of debate such as its purpose, procedure, and roles in a debate will be explained. Debate teams will also be formed. Two debate themes for the debate practice and subsequent competition will be discussed and decided by group works.

4-5. Preparation for Practical Debates: The first practice of debate will be prepared on the given debate theme to structure argumentation, collect data and evidence and arrange roles by group works.

6-7. Practice Debates 1 and 2: Two practices of debate will be performed on the basis of the prepared material by group works. Necessary instructions and advices will be given

during the practice.

8-9. Interim Evaluation of Debate: Interim evaluation of debate practices 1 and 2 in 11th and 12th week respectively will be made base on the Judgment sheets and video record, and discuss to improve the quality of debate.

10-11. Preparation for Debate Competitions: The debate competitions will be prepared on the given debate theme to structure argumentation, collect data and evidence and arrange roles by group works.

12-13. Debate Competitions 1 and 2: The debate competitions will be performed using the prepared materials by group works.

14. Preparation for Public Debate: The debate competitions will be prepared on the given debate theme to structure argumentation, collect data and evidence and arrange roles by group works.

15. Public Debate and Course summary: Public debate by the 2 excellent groups through the debate practices and competitions will be performed on the same theme used for competitions. Other students will play the judges for the public debate to decide the best debate group and the best group will be awarded. In addition, the final course summary will be made.

Text / Reference Books, etc.:
Distribution material

Grading Method:
Each class quiz: 50%, Level of participation: 20%, Contribution during debates: 20%, Mutual evaluation among group members: 10%
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 国際協力プロジェクト演習	Subject Name in English: Practical Seminar on International Cooperation Project	Credits: 2	Instructor: Kaneko Shinji
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

This practical seminar trains student's ability to communicate and discuss cross disciplinary colleagues on possible collaboration on research and practice toward solution of environmental issues, which have interdisciplinary nature, while comparing and examining differences in academic values and research methods in various different fields related to environmental research. The goal is to acquire the skills to communicate the essence of research with other researchers in other fields, as well as to comprehend the outline of research in other fields and acquire the ability to discuss jointly for solution.

Class Schedule

Class 1 Guidance and preparation for interdisciplinary seminar
Class 2 Literature review and practice of summary presentation (1)
Class 3 Literature review and practice of summary presentation (2)
Class 4 Literature review and practice of summary presentation (3)
Class 5 Literature review and practice of summary presentation (4)
Class 6 Literature review and practice of summary presentation (5)
Class 7 Literature review and practice of summary presentation (6)
Class 8 Interdisciplinary seminar of master thesis research (1)
Class 9 Interdisciplinary seminar of master thesis research (1)
Class 10 Interdisciplinary seminar of master thesis research (1)
Class 11 Interdisciplinary seminar of master thesis research (1)
Class 12 Interdisciplinary seminar of master thesis research (1)
Class 13 Interdisciplinary seminar of master thesis research (1)
Class 14 Interdisciplinary seminar of master thesis research (1)
Class 15 Summary
Report for synthesizing the learnings from literature review and interdisciplinary seminar.

Text / Reference Books, etc.:
Handouts

Grading Method:
Evaluations is made by mid-term examination, final examination and contribution to the class.
Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 国際公務員実務演習 A	Subject Name in English: Seminar on Practices for International Civil Servants A	Credits: 2	Instructor: Kaneko Shinji
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

The course provides practical management methods for projects focusing on ODA (Official Development Assistance) scheme in terms of participatory planning, project monitoring with earned value management,
and performance evaluation using DAC 5 criteria. In this class, students will participate the workshop for PCM, exercise the project monitoring and evaluation methods, and study the cases of international cooperation projects.

The class objectives are:

1) To understand the logic of PDM through PCM workshop
2) To learn Earned Value Management and DAC 5 criteria for project monitoring and evaluation
3) To study the monitoring and evaluation of international cooperation projects

Class Schedule

lesson1 Course Guidance
lesson2 Program and Project (Lecture)
lesson3 Project Cycle Management (PCM) method (Participatory Planning)
lesson4 Summary of PCM
lesson5 Stakeholders Analysis
lesson6 Problems Analysis
lesson7 Objectives Analysis
lesson8 Project Selection
lesson9 Project Design Matrix (PDM)
lesson10 Plan of Operation
lesson11 Earned Value Project Management (Lecture & Exercise)
lesson12 Project Monitoring (Lecture)
lesson13 Project Evaluation (DAC 5 criteria) (Lecture & Exercise)
lesson14 Project Monitoring & Evaluation Case Study (JICA/International Donors) (Group work & Presentation)
lesson15 Summary

Text / Reference Books, etc.:

Handouts

Grading Method:

Evaluations is made by (1) contribution to the class and (2) report.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 国際公務員実務演習 B	Subject Name in English: Seminar on Practices for International Civil Servants B	Credits: 2	Instructor: Kaneko Shinji
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

The lecture provides opportunities of practical skills for preparing job application to international organizations and NGOs and making project proposals for those who wish to find job opportunity in international organizations and international NGOs.

Class Schedule

Class 1 Careers and job opportunities in international organizations and international NGOs
Class 2 Self-assessment and development of curriculum vitae (1)
Class 3 Self-assessment and development of curriculum vitae (2)
Class 4 Self-assessment and career plan
Class 5 Career path in international organization (1)
Class 6 Practical seminar with use of INSPIRA (1)
Class 7 Practical seminar with use of INSPIRA (2)
Class 8 Practical seminar with use of INSPIRA (3)
Class 9 Career path in international organization (2)
Class 10 Project proposal development (1)
Class 11 Project proposal development (2)
Class 12 Project proposal development (3)
Class 13 Project proposal development (4)
Class 14 Career path in international organization (3)
Class 15 Presentation of project proposal

Text / Reference Books, etc.:

Handouts

Grading Method:

Evaluations is made by mid-term examination, final examination and contribution to the class.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: International Environmental Cooperation Studies	Subject Name in English: International Environmental Cooperation Studies	Credits: 2	Instructor: Fujiwara Akimasa, Chikaraishi Makoto, Kubota Tetsu, Zhang Junyi, Maharjan Keshav Lall, Kaneko Shinji, Yoshida Yuichiro, Lee Hansoo, Shimizu Kinya, Hosaka Tetsuro, Tran Dang Xuan
		Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

Objectives

(i) Promotion of deep understanding of the cutting-edge for global climate change and environmental cooperation

(ii) Introduction of state-of-the-art of international environmental cooperation

Outcomes

An ability to understand the relationship between development and environment, and to grasp environmental problems with global and multidisciplinary aspects:

(i) Considering the development stage of nation and region, students can interpret current existing and future expected problems.

(ii) From both viewpoints of developed and developing countries, students can apply social and natural scientific knowledge concerning mitigation and adaptation of global environmental issues.

(iii) Students can define the low-carbon society and design a whole framework to realize it.

Class Schedule

lesson1: Course plan and Introduction
lesson2: Urban system design to prevent global warming 1
lesson3: Urban system design to prevent global warming 2
lesson4: Urban system design to prevent global warming 3
lesson5: Urban system design to prevent global warming 4
lesson6: Policymaking and design of institutional systems 1
lesson7: Policymaking and design of institutional systems 2
lesson8: Policymaking and design of institutional systems 3
lesson9: Environmental impact assessment 1
lesson10: Environmental impact assessment 2
lesson11: Development of Environmental Education 1
lesson12: Wise use of biomass resources 1
lesson13: Wise use of biomass resources 2
lesson14: Wise use of biomass resources 3
lesson15: Discussion
Examination

Text / Reference Books, etc.:

Distribution materials

Grading Method:

Examination: 70%, Each class quiz: 30%

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: 演習 C	Subject Name in English: Seminar C	Credits: 2	Instructor: Kubota Tetsu, Zhang Junyi, Nishina Daisaku, Matsumura Yukihiko, Tsukai Makoto, Tran Dang Xuan, Hosaka Tetsuro, Lee Hansoo, Fujiwara Akimasa, Kashima Saori, Chikaraishi Makoto
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

To find high-level papers on international economic development and to develop critical reading skills. Students will learn how to summarize and communicate research results through regular research progress reports, and acquire the ability to critically examine and discuss other research reports.

Class Schedule

Class 1: Presentation on thesis research
Class 2: Presentation on thesis research
Class 3: Paper reading
Class 4: Presentation on thesis research
Class 5: Presentation on thesis research
Class 6: Paper reading
Class 7: Presentation on thesis research
Class 8: Presentation on thesis research
Class 9: Paper reading
Class 10: Presentation on thesis research
Class 11: Presentation on thesis research
Class 12: Paper reading
Class 13: Presentation on thesis research
Class 14: Presentation on thesis research
Class 15: Paper reading
Oral presentation of research progress

Text / Reference Books, etc.:

Handouts

Grading Method:

Active participation in discussion and presentation.

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

<table>
<tr><td>Subject Name:
Energy Engineering and Management</td><td colspan="2">Instructor:
Thrän, Daniela
Bruckner, Thomas</td></tr>
<tr><td>Credits:
5, (10ECTS)</td><td>Lesson Sytle:
Lecture, Seminar</td><td>Teaching Style:
Omnibus</td></tr>
<tr><td colspan="3">Class Objectives / Class Outline
The subject presents an overview of the most relevant power supply technologies, electricity demand, conversions and storage technologies, as well as transport networks. Beside power engineering, financial and environmental aspects of business management are introduced. The knowledge acquired is applied to practical examples in the seminar.

The objectives of the course are as follows:
Students acquire solid basic technological, environmental and economical knowledge in different energy technologies. Students are able to assess different power supply options at a business level.</td></tr>
<tr><td colspan="3">Subject of Components:
Energy Engineering (2 hours/week)
Energy Management (2 hours/week)
Seminar & Field trip (2 hours/week)</td></tr>
<tr><td colspan="3">Grading Method:
Written exam (50%)
Report (50%)
Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]</td></tr>
</table>

Subject Name: Water Resources Management	Instructor: Geyler, Stefan Klauer, Bernd	
Credits: 5, (10ECTS)	Lesson Style: Lecture, Seminar	Teaching Style: Omnibus

Class Objectives / Class Outline

Environmental resources management will be dealt with by example of the resource water. Starting point is the question by whom and by means of which instruments the goods provided by that resource can be managed best. Characteristic resource conflicts will be reviewed, an overview of evaluation questions and evaluation processes will be given, the application of important prediction instruments will be covered and possible decision making criteria for conflict situations will be discussed. The acquired knowledge will be applied in practical examples. The solution of sub-problems will be practiced in a seminar-like context.

The objectives of the course are as follows:

Students are able to support decisions regarding the management of environmental resources, as well as their implementation and communication. They are proficient with different management instruments, can recognize and analyze resource conflicts, apply assessments and prognosis methods, define decision criteria, and are familiar with the principles of public participation.

Subject of Components:

Water Resources Management (2 hours/week)

Economic Aspects of Water Resources Management (2 hours/week)

Seminar Water Resources Management (3 hours/week)

Grading Method:

Seminar paper with oral presentation

Written exam

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Sustainable Energy Economics	Instructor: Bruckner, Thomas	
Credits: 5, (10ECTS)	Lesson Style: Lecture, Seminar	Teaching Style: Individual

Class Objectives / Class Outline

In the context of the lecture "Energy Economics" economic aspects of energy supply with special regard to liberalized energy markets will be discussed. The second lecture "Energy System Modeling" presents different energy system optimization models, energy economic approaches and integrated assessment methods applied to support energy economic and climate political decisions on the basis of different operation research methods. The acquired knowledge will be applied in practical examples and practices in a seminar-like context. For that there will be an introduction either to the GAMS (modelling language) or Python (programming language).

Students will be able to understand the mode of operation of energy markets - especially of deregulated energy markets -. Moreover, the course presents different procedures to analyze national and international problems in the area of energy and climate policy. The students will learn how to develop simple optimization models on their own and choose suitable methods for solving the most important decision problems in these areas.

Subject of Components:
Energy Economics (2 hours/week)
Integrated Assessment Modelling (2 hours/week)
Seminar (2 hours/week)

Grading Method:
Seminar paper with oral presentation (50%)
Written exam (50%)
Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Land Management	Instructor: Meyer, Burghard Fischer, Jens-Uwe	
Credits: 5, (10ECTS)	Lesson Style: Lecture, Seminar	Teaching Style: Omnibus

Class Objectives / Class Outline

The subject imparts knowledge about land uses, instruments and institutions in selected European Sates as well as about EU strategies and their impacts on national land use planning.

Focus lies on strategies and approaches for sustainable land management in urban environments and in the countryside. Suitable instruments for planning and incentives will be presented and the role of various stakeholders will be elaborated. In small teams students will prepare, present and discuss selected land use problems, instruments and institutions from their own national background.

The objectives of the course are, to get students an insight into:

- introduction to the topics landscape, land use and land management in the context of sustainability,
- knowledge and application of suitable management instruments,
- reflexion about similarities and differences in the European context and
- definition of problems and finding of solutions in teams

Subject of Components:

Land Management in the European Context (2 hours/week)

Landscape Management (2 hours/week)

Integrated Brownfield Re-Use Strategies / Policies and Tools (2 hours/week)

Grading Method:

Written exam

Seminar paper

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Environmental and Biodiversity Economics	Instructor: Quaas, Martin	
Credits: 5, (10ECTS)	Lesson Style: Lecture, Seminar, Field work	Teaching Style: Individual

Class Objectives / Class Outline

The course covers the following:

- environmental economic theory to externalities and public goods,
- economic valuation of environmental goods,
- analysis of environmental policy instruments in partial and general equilibrium,
- environmental policy instrument under uncertainty and information asymetrie,
- concept for the measurement and valuation of Biodiversity, concept of environmental economy for biodiversity protection

The objectives of the course are as follows.

Students can describe and critically discuss the economic causes and consequences of environmental issues. They are able to describe allocative issues in partial and general equilibrium for various environmental problems (loss of biodiversity, anthropogenic climate change, air pollution etc.). With the help of environmental economic methods and concepts, students are able to evaluate and question the macroeconomic efficiency and distributional effects of current environmental and biodiversity policies. They can apply various environmental economics instruments (taxes, emission rights, environmental liability law, regulations etc.) to develop solution approaches to environmental issues and biodiversity loss.

Subject of Components:

Environmental and Biodiversity economic (4 hours/week)

Practice (2 hours/week)

Grading Method:

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Integration Module	Instructor: Bruckner, Thomas	
Credits: 7.5, (15ECTS)	Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

The project work takes place in interdisciplinary groups and involves conducting a case study for a given sustainability issue, or with a given method. Depending on the topic, the following steps are required:

- Analyze a complex socio-ecological and/or socio-technical system
- Identify societal conflicts
- Select and apply an appropriate scientific method
- Compare different solution approaches and/or assess societal conflicts
- Present scientifically-based actions aimed at improving sustainability

The objectives of the lecture are as follows:

Students are able to analyze and solve complex problems in the field of sustainable development as a member of an interdisciplinary team. They can further develop scientific methods and instruments from different disciplines (in particular economics, social sciences, environmental sciences, inter- and transdisciplinary research etc.) and independently apply a multidisciplinary research methodology that is based on an understanding of the complex interdependence of socio-ecological and/or socio-technical systems and societal conflicts. They can assess future-oriented solution approaches and advocate scientifically-based actions aimed at improving sustainability. They are also able to integrate the inherent complexity, uncertainty and required long-term thinking of sustainable development, into their argumentation.

In this seminar, students will familiarize themselves with interdisciplinary teamwork: they can present and advocate solutions options and/or assessment results to both experts and non-experts. Additionally, students will be able to independently conduct extensive scientific research in preparation for their master's thesis.

Subject of Components:

Integration Module

Grading Method:

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Project Management and Communication Skills	Instructor: Saupe, Gerit Pahl, Burkhard	
Credits: 2.5, (5ECTS)	Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

Objectives are systematic methods to expand team and leadership competences as well as an overview of various theoretical approaches to problem and project structuring. After taking the course participants will be able to choose suitable management instruments for different professional application areas and apply standard instruments.

The subject introduces the aims of project management and presents various instruments such as Standard Project Management Body of Knowledge (PMBOK) of the Project Management Institute (PMI), Competence Baseline (ICB) of the International Project Management Association (IPMA), Projects in Controlled Environments (Prince2), ISO 10006 Guidelines and other. The course further includes presentations from experts with successful applications in the industry. The application of project management software will be practised.

Subject of Components:

Conflict Management (1 hour/week)

Project Management (2 hours/week)

Grading Method:

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Material Flow Management	Instructor: Thrän, Daniela	
Credits: 2.5, (5ECTS)	Lesson Style: Lecture	Teaching Style: Individual

Class Objectives / Class Outline

The subject presents an introduction to the main theoretical and practical concepts of the current methodologies used for an appropriate management of material flows. In particular, the module will focus on Life Cycle Assessment, considered as the basis for the state-of-the-art methodologies for the evaluation of potential impacts arising from products, processes and services. The lecture will provide the methodological basis of LCA according to the standard ISO norms, whilst at the same time providing practical examples for applying the methods for inventory analysis and the subsequent impact assessment models.

The lecture with integrated exercises covers an introduction to the main approaches to material flow management. Because of its manifold applications (carbon footprint, EU sustainability regulation etc.), the main focus lies on LCA. After a theoretical presentation of concepts and principles, students are required to apply LCA to a case study.

The objectives of the course are as follows.

Students are familiar with the main theoretical and applied concepts of the current methodologies of energy and material flow management, in particular with Life Cycle Assessment (LCA). Students can apply the LCA principles according to ISO standards to evaluate the potential environmental impacts arising from products, processes and services. They are able to carry out life cycle inventory and life cycle impact assessment.

Subject of Components:

Material Flow Management (3 hours/week)

Grading Method:

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Sustainability Assessment of the Energiewende	Instructor: Bruckner, Thomas	
Credits: 2.5, (5ECTS)	Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

The sustainability Assessment of the "Energiewende" aims to link theory with practice by applying theoretical concepts of sustainability and sustainability assessment to selected problem contexts. It aims to enable students to understand the complexity of reaching a sustainable output not only of international agreements between national governments, but as well as of international projects between civil society and business groups. Students will be trained to use analytical models to critically and systematically evaluate international agreements and projects. It employs innovative didactical methods such as role playing to enable students to critically apply assessment instruments. Finally, the seminar aims to enhance the argumentation and communication skills of the students.

The assessment of International environmental policies and projects can be conducted through the perspective of sustainability. These 'sustainable' policies and projects aim to attenuate environmental stress for instance by imposing a more efficient use of resources.

Since sustainable development is not autonomous, it requires management. It pre-requires standards for achieving the desired sustainability performance. Thus it needs various frameworks of assessment. Frameworks aim to demonstrate the linkages between the key elements of entrepreneurship and standards of sustainable development. Nevertheless, sustainability as a concept needs to be addressed as part of a larger system. Other concepts such as equity, fairness, human rights and political feasibility may inhibit the implementation of sustainability projects.
The analysis of how the process of policy-making and project implementation runs in the international and national context offers the opportunities to come up with strategies to cope with the weaknesses and to take advantage of the strengths of sustainability policies and projects.

Subject of Components:
Sustainability Assessment of the Energiewende (2 hours/week)

Grading Method:

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Modelling in Resources Management	Instructor: Bruckner, Thomas Drechsler, Martin	
Credits: 5, (10ECTS)	Lesson Style: Lecture	Teaching Style: Omnibus

Class Objectives / Class Outline

The first lecture presents various energy system models, energy industry models and integrated assessment models to support decision makers in the energy industry and climate policy. After the presentation of the corresponding Operation Research methods, exemplary results of different energy optimization models will be discussed. In addition, it will show how computer models can be created to support the decision-making process in the energy industry or energy policy. Ecological modelling of populations, economic modelling of nature conservation instruments, ecological-economic modelling of nature conservation instruments and land use dynamics, integration of different policy objectives.

The students are able to describe the most important approaches to modeling energy supply systems and are able to program simple computer models for the analysis of energy economics and energy policy issues. In addition, the students are proficient in the basics of ecological, economic and ecological-economic modelling, can discuss questions of nature conservation economics and read and understand scientific papers on the topic.

Subject of Components:

Energy System and Agent Based Modelling (2 hours/week)

Ecological-Economic Modelling for Biodiversity Conservation (2 hours/week)

Grading Method:

Written exam

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

Subject Name: Entrepreneurship Management	Instructor: Dornberger, Utz Berribes-Flemmig, Claudia	
Credits: 5, (10ECTS)	Lesson Style: Seminar, Field work	Teaching Style: Collaboration

Class Objectives / Class Outline

This subject illustrates in depth the main strategies and concepts for the management of business start-ups. In the first place students will learn the methodologies for elaborating a Business Model and a Business Plan. In this way, they develop important competences which can be applied in the conception and planning of new businesses.

In the progress of the course, an internet-based "Business Simulation Game", will be carried out, using the acquired knowledge to write Business Plans. Groups of max 4 members are formed and must encounter strategic decisions to business planning.

Subject of Components:

Entrepreneurship Management (3 hours/week)

Business Simulation Game (3 hours/week)

Grading Method:

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]

<table>
<tr><td>Subject Name:
Economics and Natural Resource Use and Conservation</td><td colspan="2">Instructor:
Quaas, Martin</td></tr>
<tr><td>Credits:
5, (10ECTS)</td><td>Lesson Style:
Lecture, Seminar, Field work</td><td>Teaching Style:
Individual</td></tr>
<tr><td colspan="3">Class Objectives / Class Outline
The overviews of the course are as follows.
· Use of renewable natural resources,
· economic analysis of overuse of natural resources and of biodiversity loss,
· economic concepts and instruments of the nature protection,
· use of non-renewable resources,
· Theory of “green” economic growth,
· sustainable economics,

The objectives of the course are as follows:
Students are familiar with the political-economic value of natural resources. They can recognize the principles for the sustainable and efficient use of natural resources, and take into account current and future use options as well as trade-offs between use and conservation. They are able to apply the most relevant methods and concepts of modern resource and sustainable economics in order to estimate the optimal use of natural resources (i.e. forests, fisheries, biodiversity etc.), and the required conservation for future generations. Students can identify the reasons for overuse and can apply pertinent economic approaches and instruments for environmental conservation.</td></tr>
<tr><td colspan="3">Subject of Components:
Economics and Natural Resource Use and Conservation (4 hours/week)
Practice (2 hours/week)</td></tr>
<tr><td colspan="3">Grading Method:
Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]</td></tr>
</table>

Subject Name: 修士論文	Subject Name in English: Master Thesis	Credits: 15	Instructor: Kubota Tetsu, Zhang Junyi, Nishina Daisaku, Matsumura Yukihiko, Tsukai Makoto, Tran Dang Xuan, Hosaka Tetsuro, Lee Hansoo, Fujiwara Akimasa, Kashima Saori, Chikaraishi Makoto
		Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

By completing a master thesis of their own research theme individually, students will obtain competencies in identifying unsolved problems, figuring out observed and unobserved factors related to problems, discovering new facts based on objective analysis, and disseminating them through the publication of papers and communications to society. finding unknown . Lectures will direct their topics, make feedbacks to support their thesis writings and train a skill of paper presentation.

Class Schedule

During the entire of this course, students will complete their own thesis and make a presentation individually based on the instruction from supervisors.

• Kubota Tetsu

Conduct research training on implementation of energy-saving techniques for buildings/cities for achieving low-carbon societies, focusing especially on the hot-humid climates of Southeast Asia.

• Zhang Junyi

Conduct research training on interdisciplinary research related to regional and urban planning, mobility design, energy and environmental policy, tourism and health policy, and human errors, from a perspective of mobilities and urban policy.

• Nishina Daisaku

Conduct research training on engineering research related to urban and architectural environment from the viewpoints of water environment, urban landscape and environmental phycology.

• Matsumura Yukihiko

Conduct research training on biomass organic wastes and supercritical fluid.

• Tsukai Makoto

Conduct research training on statistical data analysis related to urban and transportation planning.

• Tran Dang Xuan

Conduct research on isolation and identification of secondary metabolites derived from crops tolerant to climate changes (drought, salt damage, high temperature, flooding), weeds and pathogen infection, as well as the social implementation of elite genes for breeding in crops.

• Hosaka Tetsuro

Conduct research training on implementation of sustainable management of forest, farmland and urban ecosystems for balancing human social activities and conservation of healthy ecosystems.

• Lee Hansoo

Conduct researches and educations on the following s; assessment of global warming impacts on coastal region, and assessment of renewable energy resource by using regional climate modelling.

• Fujiwara Akimasa

Conduct research training on inter-disciplinary research related to transportation engineering from the viewpoints of transport planning methods and transport policy evaluations.

• Kashima Saori

Conduct research training on inter-disciplinary research related to epidemiological study focusing on environmental health problems and study on development of health care system based on spatial statistics.

• Chikaraishi Makoto

Conduct research training on interdisciplinary research particularly on the methodological development and policy evaluation, dealing with social, economic, and environmental risks towards the development of sustainable infrastructure systems.

Text / Reference Books, etc.:

Distribution materials

Grading Method:

Grading: Excellent: S or ≧90, Superior: A or ≧80, <90, Good: B or ≧70, <80, Fair: C or ≧60, <70, Fail: D or <60

Subject Name: Master's Thesis	Instructor: Bruckner Thomas, Dornberger Utz, Engel Ulf, Fischer Jens-Uwe, Gawel Eric, Klauer Bernd, Lehmann Paul, Nissen Sylke, Pahl Burkhard, Quaas Martin, Schnabl Gunther, Thrän Daniela, Berrones-Flemming Claudia Nelly, Geyler Stefan, Meyer Burghard, Rietdorf Ute	
Credits: 15, (30ECTS)	Lesson Style: Seminar	Teaching Style: Individual

Class Objectives / Class Outline

Students receive guidance, write a master's thesis and take an oral examination.

- Bruckner, Thomas: Research guidance on energy systems modelling and climate change
- Dornberger, Utz: Research guidance on Innovation Management and International Entrepreneurship
- Engel, Ulf: Research guidance on Peace and security in Africa, and Violent de- and Reterritorialization in Africa
- Fischer, Jens-Uwe: Research guidance on Soil protection and Land recultivation
- Gawel, Eric: Research guidance on New Insitutional Economics and Environmental Economics
- Klauer, Bernd: Research guidance on Water resource economics and River basin management
- Lehmann, Paul: Research guidance on Energy transition and Energy externalities
- Nissen, Sylke: Research guidance on EU Integration and Urban transformation
- Pahl, Burkhard: Research guidance on Building design and management and cultural heritage management
- Quaas, Martin: Research guidance on Economic-ecological modelling and Biodiversity
- Schnabl, Gunther: Research guidance on Monetary integration and Investment crisis
- Thrän, Daniela: Research guidance on Biomass energy and Energy transition
- Berribes-Flemmig, Claudia Nelly: Research guidance on SME financial Management and Social entrepreneurship
- Geyler, Stefan: Research guidance on Sustainable Infrastructure Management and Water resource management
- Meyer, Burghard: Research guidance on Landscape ecology and Landscape modelling
- Rietdorf, Ute: Research guidance on Rural development and African development

Grading Method:

Five Grade Evaluation: [Sehr gut], [Gut], [Befriedigend], [Ausreichend], [Mangelhaft]