ATTACHED TABLE 1 別表1

(Students admitted in and after AY 2012 平成24年度以降の入学生)

Course Code 科目コード	Course Name 授業科目の名称	CREDITS 単位数			Related Field					
		REQ 必修	SEL 選択		CS	SY	CN	IT	SE	PM
			Core	Advanced						
	〈 Conversion Courses 〉 ＜コンバージョン科目＞									
CV1	Logic Circuit Design コンピュータ論理回路設計論			2						
CV2	Programming Languages プログラミング言語			2						
CV3	Operating Systems オペレーティングシステム			2						
CV4	Computer Architecture コンピュータアーキテクチャ			2						
CV5	Algorithms and Data Structures アルゴリズムとデータ構造			2						
CV6	Formal Languages and Compilers 形式言語とコンパイラ			2						
CV7	Database Management Systems データベース管理システム			2						
CV8	Computer Graphics コンピュータグラフィックス			2						
	〈 Regular Courses 〉 ＜専門科目＞									
	[Graduate Department of Computer and Information Systems] 〔コンピュータ・情報システム学専攻〕									
	Field of Study CS: Computer Science CS教育研究領域（コンピュータサイエンス）									
	≪Core Course コア科目≫									
CSC01	Information Security 情報セキュリティー		2		●					
CSC02	Statistical Signal Processing 統計的信号処理		2		●	○	○	○	○	○
CSC03	Applied Statistics 応用統計		2		●	○	○	○	○	○
CSC04	Quantum Information 量子情報科学		2		●	○	○	○	○	○
CSC05	Computation Theory 計算理論		2		●	○	○	○	○	○
CSC06	Introduction to Meta-heuristics		2		●	○	○	○	○	○
CSC07	Advanced Graph Theory グラフ理論		2		●	○	○	○	○	○
CSC08	Numerical Modeling and Simulations 数値モデリングとシミュレーション		2		●					
CSC09	High Performance Computing		2		●					
CSC10	Computational Fluid Dynamics 計算流体力学		2		●					
	≪Advanced Course アドバンス科目≫									
CSA01	Neural Networks I: Fundamental Theory and Applications ニューラルネットワークⅠ（基礎理論と応用）			2	●					
CSA02	Generation of Combinatorial Configurations 組み合わせ論的配置の生成法			2	●					
CSA03	Nature Inspired Design ネイチャーインスパイヤード・デザイン			2	●					
CSA04	Theory of Evolving Network 成長するネットワークの理論			2	●					○
CSA05	Formal Specifications of Processing プロセスの形式仕様記述論			2	●					
CSA06	Computation Models: Term Rewriting Systems 計算モデル：項書換系			2	●					
CSA07	Topics in Numerical and Applied Computation I 応用計算特論 I			2	●					
CSA08	Topics in Numerical and Applied Computation II 応用計算特論 II			2	●					

Course Code 科目コード	Course Name 授業科目の名称	CREDITS 単位数			Related Field					
		REQ 必修	SEL 選択		C S	S Y	C N	I T	S E	P M
			Core	Advanced						
CSA09	Computational Complexity Theory 計算複雑性論			2	●					
CSA10	Theory of Automata and Languages オートマトン及び言語理論特論			2	●					
CSA11	Advanced Analysis 解析学特論			2	●					
CSA12	Theory of Genetic Algorithms 遺伝的アルゴリズム			2	●					
CSA13	Algebraic Systems and Combinatorics 代数系と組み合わせ論			2	●					
CSA14	Nonassociative Algebras and Lie Algebras 非結合的代数系とリー代数			2	●					
CSA15	Computational Physics and Simulation 計算機物理学とシミュレーション			2	●					
CSA16	Computational Superstring Theory 計算機を用いた超弦理論研究			2	●					
CSA17	Computer Simulation of Stochastic Processes			2	●					
	Field of Study SY: Computer Systems SY教育研究領域（コンピュータシステム）									
	≪Core Course コア科目≫									
SYC01	MOS Device Modeling for VLSI Design		2			●				
SYC02	Digital VLSI Design デジタルVLSI設計論		2			●				
SYC03	Electronic Design Automation for Digital VLSI Implementation		2			●				
SYC04	Advanced Computer Organization		2			●				
SYC05	Embedded Real-Time Systems		2			●		○		
SYC06	Advanced Computer Architecture		2			●				
SYC07	Advanced Operating Systems		2			●				
	≪Advanced Course アドバンス科目≫									
SYA01	Application-Specific Highly-Parallel Algorithms/Architectures アプリケーション指向並列アルゴリズム及び構造論			2		●				
SYA02	Reconfigurable Computing リコンフィギャラブル・コンピューティング			2		●				
SYA03	Special Topics in Computer Architecture			2		●				
SYA04	Optoelectronics Computer and Communication Devices オプトエレクトロニクスコンピュータと通信デバイス			2		●				
SYA05	Analog VLSI Design アナログVLSI設計論			2		●				
SYA06	Advanced Devices for Computer and Communication Systems コンピュータ及び通信システム用デバイス特論			2		●				
SYA07	Modeling of Advanced Devices デバイスモデリング特論			2		●				
SYA08	Electronic Design Automation for System-level Design			2		●				
SYA09	Multicore Computing			2		●				
SYA10	Software Engineering for Embedded Systems 組み込みソフトウェア工学基礎			2		●				
SYA11	Techniques of Software Engineering for Embedded Systems 組み込みソフトウェア工学演習			2		●				
SYA12	Best Practices in Embedded Software Development			2		●				
SYA13	Fundamentals and Practices of High Quality and Safety-Critical Embedded Systems 安心・安全な組み込みシステムの基礎と実践			2		●				

Course Code 科目コード	Course Name 授業科目の名称	CREDITS 単位数			Related Field					
		REQ 必修	SEL 選択		C S	S Y	C N	I T	S E	P M
			Core	Advanced						
	Field of Study CN: Computer Network Systems CN教育研究領域（コンピュータ・ネットワークシステム）									
	≪Core Course コア科目≫									
CNC01	Computer Communications and Networking コンピュータコミュニケーションとネットワーキング		2				●			
CNC02	Network Management ネットワーク管理		2				●			
CNC03	Selected Topics of Future Internet		2				●			
	≪Advanced Course アドバンス科目≫									
CNA01	Advanced Internet Technology and Applications インターネット技術応用特論			2			●			○
CNA02	Multimedia Networking マルチメディアネットワーキング			2			●			
CNA03	Wireless and Mobile Networks			2			●			
CNA04	Performance Evaluation of Network Systems ネットワークシステムの性能評価			2			●			
CNA05	Distributed Algorithms for Networks			2			●			
CNA06	Advanced Internetworking Technologies インターネットワーキング技術特論			2			●			
CNA07	Optical Communications and Networks			2			●			
CNA08	High-Reliability Network Systems Engineering			1			●			
CNA09	Ubiquitous Network Systems and Applications ユビキタスネットワークシステムとアプリケーション			2			●			○
	Field of Study IT: Applied Information Technologies IT教育研究領域（応用情報工学）									
	≪Core Course コア科目≫									
ITC01	Java 2D/3D Graphics		2					●		
ITC02	Introduction to Sound and Audio 音響・音声入門		3					●		
ITC03	Advanced Robotics		2					●		
ITC04	Modern Control Theory		2					●		
ITC05	Pattern Recognition and Machine Learning［From AY2013］		2					●		
ITC06	Introduction to Bioinformatics		2					●		
ITC07	Introduction to Biosignal Detection		2					●		
ITC08	Medical Informatics		2					●		
	≪Advanced Course アドバンス科目≫									
ITA01	Computer Music コンピュータミュージック			2				●		
ITA02	Advanced Architectures for Synthetic Worlds 人工世界のための先進的アーキテクチャ			2				●		
ITA03	Biomedical Modeling and Visualization 生体モデルとその可視化			2				●		
ITA04	Finite Element Modeling and Visualization 有限要素モデリングと可視化			2				●		
ITA05	Java Game Programming			2				●		
ITA06	Image Recognition and Understanding 画像の認識と理解			2				●		
ITA07	Advanced Signal Processing 信号処理特論			2				●		
ITA08	Remote Sensing リモートセンシング			2				●		
ITA09	Document Analysis and Recognition 文書メディアの理解・認識			2				●		

Course Code 科目コード	Course Name 授業科目の名称	CREDITS 単位数			Related Field					
		REQ 必修	SEL 選択		CS	SY	CN	IT	SE	PM
			Core	Advanced						
ITA10	Spatial Hearing and Virtual 3D Sound 空間聴覚とバーチャル3Dサウンド			2				●		
ITA11	Computer-assisted Language Learning			2				●		○
ITA12	Documentation for Technical Procedures			2				●		
ITA13	Multimedia Pattern Searching マルチメディアパターン探索			2				●		
ITA14	Automatic Speech Recognition: Theory and Practice			2				●		
ITA15	Speech Articulation and Acoustics			2				●		
ITA16	Advanced Database Management Systems データベース管理システム特論			2				●		
ITA17	Intelligent Information Retrieval and Text Mining			2				●		
ITA18	Sensing and Control Engineering 計測と制御			2				●		
ITA19	Reliable System for Lunar and Planetary Explorations			2				●		
ITA20	Knowledge Discovery and Data Mining			1				●		
ITA21	Semantic Web Technologies			1				●		
ITA22	Fundamental Data Analysis in Lunar and Planetary Explorations			2				●		
ITA23	Practical Data Analysis with Lunar and Planetary Databases			2				●		
ITA24	Biomedical Imaging and Analysis			2				●		
ITA25	Biosignal Processing and Data Mining 生体信号処理とデータマイニング			2				●		
ITA26	Bioinformatics Algorithms			2				●		
	Field of Study SE: Software Engineering SE教育研究領域（ソフトウェアエンジニアリング）									
	≪Core Course コア科目≫									
SEC01	Theory and Practice of Software Engineering I		2						●	
SEC02	Theory and Practice of Software Engineering II		2						●	
SEC03	Software Engineering for Internet Applications		2						●	
SEC04	Programming Strategies and Software Development Tools		2						●	
	≪Advanced Course アドバンス科目≫									
SEA01	Parallel Distributed & Internet Computing 並列・分散・インターネットコンピューティング			2					●	○
SEA02	Distributed Systems: Principles and Paradigms 分散システムの原理と実例			2					●	
SEA03	Introduction to Information Retrieval 情報検索入門			2					●	
SEA04	Declarative Programming 宣言的プログラミング			2					●	
SEA05	Parallel Programming with OpenCL OpenCLによる並列プログラミング			2					●	
SEA06	Model-Driven Software Development			1					●	
SEA07	Requirements Engineering			2					●	
SEA08	Software Project Management			1					●	

Course Code 科目コード	Course Name 授業科目の名称	CREDITS 単位数			Related Field					
		REQ 必修	SEL 選択		CS	SY	CN	IT	SE	PM
			Core	Advanced						
SEA09	Creativity Development: Approaches and Examples			1					●	
SEA10	Model-Driven Software Development II			1					●	
SEA11	Software Engineering for Space Programs			2					●	
SEA12	Object-Oriented Software Engineering			2					●	
	[Graduate Department of Information Technologies and Project Management] 〔情報技術・プロジェクトマネジメント専攻〕									
	Field of Study PM: Project Management and IT Specialist PM教育研究領域 (プロジェクトマネジメント&ITスペシャリスト)									
	≪Core Course コア科目≫									
PMC01	Managerial Economics		1							●
PMC02	Fundamentals and Practices of Project Management		2							●
	≪Advanced Course アドバンス科目≫									
PMA01	Cloud Computing クラウドコンピューティング			2				○		●
PMA02	Service-Oriented Architectures			2						●
PMA03	Business & Computer Industry ビジネスとコンピュータ産業			2						●
PMA04	International Negotiation			1						●
PMA05	Ethical Issues in Professional Life 企業における倫理課題			1						●
PMA06	Information Technology, Society, and Values			2						●
PMA07	Intellectual Property Management 知的財産管理			2						●
PMA08	Technical Writing in Software Engineering			2						●
PMA09	Fundamentals and Practices of Functional Safety Related Systems 機能安全システムの基礎と実践			2						●
	< Seminar Courses > ＜セミナー科目＞									
CFS	Creative Factory Seminar 創造工房セミナー		2							
	[Graduate Department of Computer and Information Systems] 〔コンピュータ・情報システム学専攻〕									
RS	Research Seminar I 研究セミナー I	2								
	Research Seminar II 研究セミナー II	2								
	Special Research Seminar I 特別研究セミナー I	4								
	Special Research Seminar II 特別研究セミナー II	2								
RPS	Research Plan Seminar 研究企画セミナー	2								
	Research Progress Report Seminar 研究進捗セミナー		2							
EPS	External Presentation/Publication Seminar 外部発表セミナー		2							
	[Graduate Department of Information Technologies and Project Management] 〔情報技術・プロジェクトマネジメント専攻〕									
ES	IT Specialists Educational Seminars 教育セミナー		3							
RS/C	IT Specialists Research Seminars/Conferences 研究セミナー・カンファレンス	3								
TS/C	IT Specialists Tea Seminars/Contests Teaセミナー・コンテスト	2								

Course Code 科目コード	Course Name 授業科目の名称	CREDITS 単位数			Related Field					
		REQ 必修	SEL 選択		C S	S Y	C N	I T	S E	P M
			Core	Advanced						
	< Thesis Research > ＜研究科目＞									
	[Graduate Department of Computer and Information Systems] 〔コンピュータ・情報システム学専攻〕									
	Computer and Information Systems Research コンピュータ・情報システム学研究	6								
	< Software Development Arena > ＜ソフトウェア開発アリーナ＞									
	[Graduate Department of Information Technologies and Project Management] 〔情報技術・プロジェクトマネジメント専攻〕									
	Software Development Arena I ソフトウェア開発アリーナ I	5								
	Software Development Arena II ソフトウェア開発アリーナ II	5								
	Software Development Arena III ソフトウェア開発アリーナ III	5								
	Software Development Arena IV ソフトウェア開発アリーナ IV	5								

Related Field・・・関連領域

CS・・・Computer Science (コンピュータサイエンス)

SY・・・Computer Systems (コンピュータシステム)

CN・・・Computer Network Systems (コンピュータネットワークシステム)

IT・・・Applied Information Technologies (応用情報工学)

SE・・・Software Engineering (ソフトウェアエンジニアリング)

CN・・・Project Management and IT Specialist (プロジェクトマネジメント&ITスペシャリスト)

●印は主領域 ● marks a main field

○印は主領域以外でも開講されている共通科目 **○ marks common courses to be offered in other fields except the main field**

[Completion Requirements]

Students newly enrolled in the both departments of the Master's Program must prepare a course registration plan (on the prescribed form) in consultation with respective research advisors or curriculum advisors and submit the form with the relevant advisor's signature and seal to the Student Affairs Division within two weeks after enrollment, in principle.

1 Graduate Department of Computer and Information Systems

(1) Students must earn at least a total of 30 credits; 1) 6 credits for thesis research, 2) at least 16 credits for specialized courses, and 3) at least 8 credits for seminars. Students who are advised to take conversion courses can include up to 4 credits for conversion courses in the above-mentioned 16 credits for specialized courses. Students must, in consultation with respective advisors, earn at least 8 credits for core courses in principle.

(2) With regard to seminars, students must earn at least 8 credits, including 6 credits for required courses, 4 credits from Research Seminars I and II (2 credits each), and 2 credits from Research Plan Seminar, and 2 credits from one of Creative Factory Seminars (2credits) of their choice, and 2 credits from either of Research Progress Report Seminar (2 credits) and External Presentation/Publication Seminar (2 credits).

Students whose eligibility for early completion of the Master's Program has been authorized, or students whose standard enrollment period in the Master's Program is less than two years based on agreements with relevant universities, shall register for Special Research Seminars I and II instead of Research Seminars I and II (year-round courses). Students of Dual Degree Program are reqired to earn total of 6 credits from Special Research Seminar I (4 credits) and Research Plan Seminar (2 credits) even they are affiliated to the second year of the Master's Program. However, should those students be unable to complete the Master's Program in a period of time shorter than the academic residence requirement period, registration for Special Research Seminars I and II shall be nullified and changed back to Research Seminars I and II respectively.

Applicants for early completion of the Master's Program in their first-year enrollment in the Master's Program who cannot submit a document verifying their "outstanding achievements" by the designated date and wish to request early completion a half year later than the original request, will be required to make another application for early completion of the Program. Students other than those applicants mentioned above shall register for Research Seminar II.

If courses students have completed at other graduate schools during their enrollment in the Master's Program and/or courses students have completed before entering the Master's Program are recognized as equivalent to Seminar Courses in the Master's Program, credits for such courses can be recognized as credits earned by completing Seminar Courses, up to a maximum of 4 credits.

2 Graduate Department of Information Technologies and Project Management

(1) Students must earn a total of at least 50 credits: 1) at least 20 credits for Software Development Arena I through IV, 2) at least 22 credits for specialized courses, and 3) at least8 credits for seminars. Students who are advised to take conversion courses can include up to 4 credits for conversion courses in the above-mentioned 22 credits for specialized courses. Students must, in consultation with respective advisors, earn at least 8 credits for core courses in principle.

(2) With regard to seminars, students must earn a total of at least 8 credits, including 5 credits for required courses, 3 credits from Research Seminars/Conferences and 2 credits from Tea Seminars/Contests, and at least 3 credits from one of Creative Factory Seminars (2 credits) of their choice and Educational Seminars (3 credits).

ATTACHED TABLE 1 別表1

(Students admitted in and after AY 2010 平成22年度以降の入学生)

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
< Conversion Courses > ＜コンバージョン科目＞			
Logic Circuit Design コンピュータ論理回路設計論		2	
Programming Languages プログラミング言語		2	
Operating Systems オペレーティングシステム		2	
Computer Architecture コンピュータアーキテクチャ		2	
Algorithms and Data Structures アルゴリズムとデータ構造		2	
Formal Languages and Compilers 形式言語とコンパイラ		2	
Database Management Systems データベース管理システム		2	
Computer Graphics コンピュータグラフィックス		2	
< Regular Courses > ＜専門科目＞			
[Graduate Department of Computer and Information Systems] 〔コンピュータ・情報システム学専攻〕			
Field of Study 1: Virtual Reality, Multimedia, and Biomedical IT 第1教育研究領域(バーチャルリアリティ、マルチメディアとバイオメディカル情報技術)			
Computer Music コンピュータミュージック		2	
Advanced Architectures for Synthetic Worlds 人工世界のための先進的アーキテクチャ		2	
Biomedical Modeling and Visualization 生体モデルとその可視化		2	
Finite Element Modeling and Visualization 有限要素モデリングと可視化		2	
Java 2D/3D Graphics ジャヴァ 2D/3D グラフィックス		2	
Introduction to Sound and Audio 音響・音声入門		3	
Java Game Programming		2	
Field of Study 2: Computer Organization and Parallel Processing 第2教育研究領域(コンピュータ構成と並列処理)			
Application-Specific Highly-Parallel Algorithms/Architectures アプリケーション指向並列アルゴリズム及び構造論		2	
Parallel Languages & Multimedia Tools マルチメディア並列言語構築論		2	
Supercompilers and Parallel Program Synthesis スーパーコンパイラ及び並列プログラム統合論		2	
Parallel Distributed & Internet Computing 並列・分散・インターネットコンピューティング		2	
Introduction to Parallel/Distributed Programming 並列プログラミングの基礎		2	
Parallel/Distributed Languages and Algorithms 並列分散言語とアルゴリズム		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Reconfigurable Computing リコンフィギャラブル・コンピューティング		2	
Advanced Computer Architecture		2	
Field of Study 3: Multimedia Retrieval, Human Interface, and Robotics 第3教育研究領域(マルチメディア検索、ヒューマンインターフェースとロボット工学)			
Advanced Image Processing and Algorithm 画像処理とアルゴリズム特論		2	
Image Recognition and Understanding 画像の認識と理解		2	
Advanced Signal Processing 信号処理特論		2	
Neural Networks I: Fundamental Theory and Applications ニューラルネットワークⅠ（基礎理論と応用）		2	
Remote Sensing リモートセンシング		2	
Evolutionary Algorithms and Applications 進化アルゴリズムとその応用		2	
Document Analysis and Recognition 文書メディアの理解・認識		2	
Spatial Hearing and Virtual 3D Sound 空間聴覚とバーチャル3Dサウンド		2	
Generation of Combinatorial Configurations 組み合わせ論的配置の生成法		2	
Introduction to Robotics ロボット工学序論		2	
Nature Inspired Design ネイチャーインスパイヤード・デザイン		2	
Computer-assisted Language Learning		2	
Adaptive Filtering and Applications 適応フィルタリングと応用		2	
Theory of Evolving Network 成長するネットワークの理論		2	
Documentation for Technical Procedures		2	
Multimedia Pattern Searching マルチメディアパターン探索		2	
Introduction to Automatic Speech Recognition		2	
Speech Articulation and Acoustics		2	
Field of Study 4: Knowledge Engineering, Cybernetics, and Internet Computing 第4教育研究領域(知識工学、サイバネティックスとインターネットコンピューティング)			
Advanced Database Management Systems データベース管理システム特論		2	
Autonomous Decentralized Systems 自律分散システム		2	
Formal Specifications of Processing プロセスの形式仕様記述論		2	
Distributed Systems: Principles and Paradigms 分散システムの原理と実例		2	
Computation Models: Term Rewriting Systems 計算モデル：項書換系		2	
Cloud Computing		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Advanced Internet Technology and Applications インターネット技術応用特論		2	
Introduction to Information Retrieval 情報検索入門		2	
Field of Study 5: Embedded Systems, VLSI Technologies, and Computer Devices 第5教育研究領域(組込みシステム、VLSIテクノロジとコンピュータデバイス)			
Optoelectronics Computer and Communication Devices オプトエレクトロニクスコンピュータと通信デバイス		2	
Semiconductor Manufacturing System 半導体生産システム論		2	
Modeling for VLSI Fabrication Technology VLSI製造技術のためのモデリング		2	
Digital VLSI Design デジタルVLSI設計論		2	
Analog VLSI Design アナログVLSI設計論		2	
Computer-aided Design of Integrated Circuits I 集積回路に対するコンピュータ支援設計 I		2	
Advanced Devices for Computer and Communication Systems コンピュータ及び通信システム用デバイス特論		2	
Modeling of Advanced Devices デバイスモデリング特論		2	
Advanced Computer Organization		2	
Computer-aided Design of Integrated Circuits II 集積回路に対するコンピュータ支援設計 II		2	
Embedded Real-Time Systems		2	
Multicore Computing		2	
Field of Study 6: Algorithms, Computational Modeling, and Theoretical Computer Science 第6教育研究領域(アルゴリズム、コンピュテーショナルモデリングと理論的コンピュータサイエンス)			
Topics in Numerical and Applied Computation I 応用計算特論 I		2	
Topics in Numerical and Applied Computation II 応用計算特論 II		2	
Computational Complexity Theory 計算複雑性論		2	
Theory of Automata and Languages オートマトン及び言語理論特論		2	
Probability, Entropy and Fractals 確率／エントロピー／フラクタル		2	
Advanced Analysis 解析学特論		2	
Theory of Genetic Algorithms 遺伝的アルゴリズム		2	
Algebraic Systems and Combinatorics 代数系と組み合わせ論		2	
Declarative Programming 宣言的プログラミング		2	
Nonassociative Algebras and Lie Algebras 非結合的代数系とリー代数		2	
Quantum Information Theory 量子情報理論		2	
Computational Physics and Simulation 計算機物理学とシミュレーション		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Computational Superstring Theory 計算機を用いた超弦理論研究		2	
Computer Simulation of Stochastic Processes		2	
Parallel Programming with OpenCL OpenCLによる並列プログラミング		2	
Field of Study 7: Computer Network Systems 第7教育研究領域(コンピュータネットワークシステム)			
Computer Communications and Networking コンピュータコミュニケーションとネットワーキング		2	
Multimedia Networking マルチメディアネットワーキング		2	
Personal Communication Systems and Mobile Networks パーソナルコミュニケーションと無線ネットワーク		2	
Network Management ネットワーク管理		2	
Performance Evaluation of Network Systems ネットワークシステムの性能評価		2	
Distributed Algorithms 分散アルゴリズム		2	
Advanced Internetworking Technologies インターネットワーキング技術特論		2	
Optical Communications and Networks		2	
[Graduate Department of Information Technologies and Project Management] 〔情報技術・プロジェクトマネジメント専攻〕			
Field of Study 8: Software Engineering and Information Security 第8教育研究領域(ソフトウェアエンジニアリングと情報セキュリティ)			
Cloud Computing		2	
Service-Oriented Architectures		2	
Software Engineering for Embedded Systems 組み込みソフトウェア工学基礎		2	
Business & Computer Industry ビジネスとコンピュータ産業		2	
Managerial Economics 管理者のためのミクロ経済学		1	
International Negotiation		1	
Ethical Issues in Professional Life 企業における倫理課題		1	
Information Technology, Society, and Values		2	
Model-Driven Software Development		1	
Software Development Tools		2	
Software Modeling Techniques		2	
Intelligent Information Retrieval and Text Mining		2	
Advanced Internet Technology and Applications インターネット技術応用特論		2	
Parallel Distributed & Internet Computing 並列・分散・インターネットコンピューティング		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Software Engineering for Space Programs		2	
Techniques of Software Engineering for Embedded Systems 組み込みソフトウェア工学演習		2	
Sensing and Control Engineering 計測と制御		2	
High-Reliability Network Systems Engineering		1	
Theory of Evolving Network 成長するネットワークの理論		2	
Reliable System for Lunar and Planetary Explorations		2	
Object-Oriented Software Engineering		2	
Requirements Engineering		2	
Software Project Management		1	
Intellectual Property Management 知的財産管理		2	
Technical Writing in Software Engineering		2	
Human Aspects of Software Engineering		2	
Creativity Development: Approaches and Examples		1	
Best Practices in Embedded Software Development		2	
Software Security System Engineering		2	
Functional Safety of Critical Systems		1	
Knowledge Discovery and Data Mining		1	
Architecture-Oriented Software Development		2	
Computer-assisted Language Learning		2	
Semantic Web Technologies		1	
Computer-Aided Design of Integrated Circuits II 集積回路に対するコンピュータ支援設計 II		2	
Ubiquitous Network Systems and Applications ユビキタスネットワークシステムとアプリケーション		2	
Incorporating Security into Software Development Process		2	
Fundamental Data Analysis in Lunar and Planetary Explorations		2	
Practical Data Analysis with Lunar and Planetary Databases		2	
Computer-Aided Design of Integrated Circuits I 集積回路に対するコンピュータ支援設計 I		2	
Model-Driven Software Development II		1	
Fundamentals and Practices of High Quality and Safety-Critical Embedded Systems 安心・安全な組み込みシステムの基礎と実践		2	
Fundamentals and Practices of Functional Safety Related Systems 機能安全システムの基礎と実践		2	
Fundamentals and Practices of Project Management プロジェクトマネジメントの基礎と実践		2	
Software Agents and Agent Systems		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
< Seminar Courses > ＜セミナー科目＞			
Creative Factory Seminar I 創造工房セミナー I		2	
Creative Factory Seminar II 創造工房セミナー II		2	
Creative Factory Seminar III 創造工房セミナー III		2	
Creative Factory Seminar IV 創造工房セミナー IV		2	
Creative Factory Seminar V 創造工房セミナー V		2	
Creative Factory Seminar VI 創造工房セミナー VI		2	
Creative Factory Seminar VII 創造工房セミナー VII		2	
Creative Factory Seminar VIII 創造工房セミナー VIII		2	
[Graduate Department of Computer and Information Systems] 〔コンピュータ・情報システム学専攻〕			
Research Seminar I 研究セミナー I	2		
Research Seminar II 研究セミナー II	2		
Special Research Seminar I 特別研究セミナー I	4		
Special Research Seminar II 特別研究セミナー II	2		
Research Plan Seminar 研究企画セミナー	2		
Research Progress Report Seminar 研究進捗セミナー		2	
Outside Presentation Seminar 外部発表セミナー		2	
[Graduate Department of Information Technologies and Project Management] 〔情報技術・プロジェクトマネジメント専攻〕			
IT Specialists Educational Seminars 教育セミナー		3	
IT Specialists Research Seminars/Conferences 研究セミナー・カンファレンス	3		
IT Specialists Tea Seminars/Contests Teaセミナー・コンテスト	2		
< Thesis Research > ＜研究科目＞			
[Graduate Department of Computer and Information Systems] 〔コンピュータ・情報システム学専攻〕			
Computer and Information Systems Research コンピュータ・情報システム学研究	6		
< Software Development Arena > ＜ソフトウェア開発アリーナ＞			
[Graduate Department of Information Technologies and Project Management] 〔情報技術・プロジェクトマネジメント専攻〕			
Software Development Arena I ソフトウェア開発アリーナ I	5		

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Software Development Arena II ソフトウェア開発アリーナ II	5		
Software Development Arena III ソフトウェア開発アリーナ III	5		
Software Development Arena IV ソフトウェア開発アリーナ IV	5		

[Completion Requirements]

1. Graduate Department of Computer and Information Systems

(1) Students must earn at least a total of 30 credits, namely, 6 credits from one thesis research, 16 credits or more from regular courses, and 8 credits or more from seminars. Students who are advised to enroll in conversion courses can include up to 4 credits from conversion courses in the above-mentioned 16 credits of the regular courses.

(2) With regard to seminars, students must earn at least 8 credits, including 6 credits for required courses, 4 credits from Research Seminars I and II (2 credits each), and 2 credits from Research Plan Seminar, and 2 credits from one of Creative Factory Seminars I to VIII, and 2 credits from either of Research Progress Report Seminar and Outside Presentation Seminar.

Students whose eligibility for early completion of the Master's Program has been authorized, or students whose standard enrollment period in the Master's Program is less than two years based on agreements with relevant universities, shall register for Special Research Seminars I and II instead of Research Seminars I and II (year-round courses). However, should those students be unable to complete the Master's Program in a period of time shorter than the academic residence requirement period, registration for Special Research Seminars I and II shall be nullified and changed back to Research Seminars I and II respectively.
Applicants for early completion of the Master's Program in their first-year enrollment in the Master's Program who cannot submit a document verifying their "outstanding achievements" by the designated date and wish to request early completion a half year later than the original request, will be required to make another application for early completion of the Program. Students other than those applicants mentioned above shall register for Research Seminar II.
If courses students have completed at other graduate schools during their enrollment in the Master's Program and/or courses students have completed before entering the Master's Program are recognized as equivalent to Seminar Courses in the Master's Program, credits for such courses can be recognized as credits earned by completing Seminar Courses, up to a maximum of 4 credits.

2. Graduate Department of Information Technologies and Project Management

(1) Students must earn a total of at least 50 credits: 1) at least 20 credits from the Software Development Arena I through IV, 2) at least 22 credits from the regular courses, and 3) at least 8 credits from seminar courses. Students who are advised to enroll in conversion courses can include up to 4 credits from conversion courses in the above-mentioned 22 credits of the regular courses.

(2) With regard to seminars, students must earn a total of at least 8 credits, including 5 credits for required courses, 3 credits from Research Seminars/Conferences and 2 credits from Tea Seminars/Contests, and at least 3 credits from Creative Factory Seminars I to VIII and Educational Seminars.

ATTACHED TABLE 1 別表1

(Students admitted in and before AY 2009 平成21年度までの入学生)

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
< Conversion Courses > ＜コンバージョン科目＞			
Logic Circuit Design コンピュータ論理回路設計論		2	
Programming Languages プログラミング言語		2	
Operating Systems オペレーティングシステム		2	
Computer Architecture コンピュータアーキテクチャ		2	
Algorithms and Data Structures アルゴリズムとデータ構造		2	
Formal Languages and Compilers 形式言語とコンパイラ		2	
Database Management Systems データベース管理システム		2	
Computer Graphics コンピュータグラフィックス		2	
< Regular Courses > ＜専門科目＞			
[Graduate Department of Computer and Information Systems] 〔コンピュータ・情報システム学専攻〕			
Field of Study 1: Virtual Reality, Multimedia, and Biomedical IT 第1教育研究領域(バーチャルリアリティ、マルチメディアとバイオメディカル情報技術)			
Computer Music コンピュータミュージック		2	
Advanced Architectures for Synthetic Worlds 人工世界のための先進的アーキテクチャ		2	
Biomedical Modeling and Visualization 生体モデルとその可視化		2	
Finite Element Modeling and Visualization 有限要素モデリングと可視化		2	
Java 2D/3D Graphics ジャヴァ 2D/3D グラフィックス		2	
Introduction to Sound and Audio 音響・音声入門		3	
Java Game Programming		2	
Field of Study 2: Computer Organization and Parallel Processing 第2教育研究領域(コンピュータ構成と並列処理)			
Application-Specific Highly-Parallel Algorithms/Architectures アプリケーション指向並列アルゴリズム及び構造論		2	
Parallel Languages & Multimedia Tools マルチメディア並列言語構築論		2	
Supercompilers and Parallel Program Synthesis スーパーコンパイラ及び並列プログラム統合論		2	
Parallel Distributed & Internet Computing 並列・分散・インターネットコンピューティング		2	
Introduction to Parallel/Distributed Programming 並列プログラミングの基礎		2	
Parallel/Distributed Languages and Algorithms 並列分散言語とアルゴリズム		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Reconfigurable Computing リコンフィギャラブル・コンピューティング		2	
Advanced Computer Architecture		2	
Field of Study 3: Multimedia Retrieval, Human Interface, and Robotics 第3教育研究領域(マルチメディア検索、ヒューマンインターフェースとロボット工学)			
Advanced Image Processing and Algorithm 画像処理とアルゴリズム特論		2	
Image Recognition and Understanding 画像の認識と理解		2	
Advanced Signal Processing 信号処理特論		2	
Neural Networks I: Fundamental Theory and Applications ニューラルネットワークⅠ（基礎理論と応用）		2	
Remote Sensing リモートセンシング		2	
Evolutionary Algorithms and Applications 進化アルゴリズムとその応用		2	
Document Analysis and Recognition 文書メディアの理解・認識		2	
Spatial Hearing and Virtual 3D Sound 空間聴覚とバーチャル3Dサウンド		2	
Generation of Combinatorial Configurations 組み合わせ論的配置の生成法		2	
Introduction to Robotics ロボット工学序論		2	
Nature Inspired Design ネイチャーインスパイヤード・デザイン		2	
Computer-assisted Language Learning		2	
Adaptive Filtering and Applications 適応フィルタリングと応用		2	
Theory of Evolving Network 成長するネットワークの理論		2	
Documentation for Technical Procedures		2	
Multimedia Pattern Searching マルチメディアパターン探索		2	
Introduction to Automatic Speech Recognition		2	
Speech Articulation and Acoustics		2	
Field of Study 4: Knowledge Engineering, Cybernetics, and Internet Computing 第4教育研究領域(知識工学、サイバネティックスとインターネットコンピューティング)			
Advanced Database Management Systems データベース管理システム特論		2	
Autonomous Decentralized Systems 自律分散システム		2	
Formal Specifications of Processing プロセスの形式仕様記述論		2	
Distributed Systems: Principles and Paradigms 分散システムの原理と実例		2	
Computation Models: Term Rewriting Systems 計算モデル：項書換系		2	
Cloud Computing		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Advanced Internet Technology and Applications インターネット技術応用特論		2	
Introduction to Information Retrieval 情報検索入門		2	
Field of Study 5: Embedded Systems, VLSI Technologies, and Computer Devices 第5教育研究領域(組込みシステム、VLSIテクノロジとコンピュータデバイス)			
Optoelectronics Computer and Communication Devices オプトエレクトロニクスコンピュータと通信デバイス		2	
Semiconductor Manufacturing System 半導体生産システム論		2	
Modeling for VLSI Fabrication Technology VLSI製造技術のためのモデリング		2	
Digital VLSI Design デジタルVLSI設計論		2	
Analog VLSI Design アナログVLSI設計論		2	
Computer-aided Design of Integrated Circuits I 集積回路に対するコンピュータ支援設計 I		2	
Advanced Devices for Computer and Communication Systems コンピュータ及び通信システム用デバイス特論		2	
Modeling of Advanced Devices デバイスモデリング特論		2	
Advanced Computer Organization		2	
Computer-aided Design of Integrated Circuits II 集積回路に対するコンピュータ支援設計 II		2	
Embedded Real-Time Systems		2	
Multicore Computing		2	
Field of Study 6: Algorithms, Computational Modeling, and Theoretical Computer Science 第6教育研究領域(アルゴリズム、コンピュテーショナルモデリングと理論的コンピュータサイエンス)			
Topics in Numerical and Applied Computation I 応用計算特論 I		2	
Topics in Numerical and Applied Computation II 応用計算特論 II		2	
Computational Complexity Theory 計算複雑性論		2	
Theory of Automata and Languages オートマトン及び言語理論特論		2	
Probability, Entropy and Fractals 確率／エントロピー／フラクタル		2	
Advanced Analysis 解析学特論		2	
Theory of Genetic Algorithms 遺伝的アルゴリズム		2	
Algebraic Systems and Combinatorics 代数系と組み合わせ論		2	
Declarative Programming 宣言的プログラミング		2	
Nonassociative Algebras and Lie Algebras 非結合的代数系とリー代数		2	
Quantum Information Theory 量子情報理論		2	
Computational Physics and Simulation 計算機物理学とシミュレーション		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Computational Superstring Theory 計算機を用いた超弦理論研究		2	
Computer Simulation of Stochastic Processes		2	
Parallel Programming with OpenCL OpenCLによる並列プログラミング		2	
Field of Study 7: Computer Network Systems 第7教育研究領域(コンピュータネットワークシステム)			
Computer Communications and Networking コンピュータコミュニケーションとネットワーキング		2	
Multimedia Networking マルチメディアネットワーキング		2	
Personal Communication Systems and Mobile Networks パーソナルコミュニケーションと無線ネットワーク		2	
Network Management ネットワーク管理		2	
Performance Evaluation of Network Systems ネットワークシステムの性能評価		2	
Distributed Algorithms 分散アルゴリズム		2	
Advanced Internetworking Technologies インターネットワーキング技術特論		2	
Optical Communications and Networks		2	
[Graduate Department of Information Technologies and Project Management] 〔情報技術・プロジェクトマネジメント専攻〕			
Field of Study 8: Software Engineering and Information Security 第8教育研究領域(ソフトウェアエンジニアリングと情報セキュリティ)			
Cloud Computing		2	
Service-Oriented Architectures		2	
Software Engineering for Embedded Systems 組み込みソフトウェア工学基礎		2	
Business & Computer Industry ビジネスとコンピュータ産業		2	
Managerial Economics 管理者のためのミクロ経済学		1	
International Negotiation		1	
Ethical Issues in Professional Life 企業における倫理課題		1	
Information Technology, Society, and Values		2	
Model-Driven Software Development		1	
Software Development Tools		2	
Software Modeling Techniques		2	
Intelligent Information Retrieval and Text Mining		2	
Advanced Internet Technology and Applications インターネット技術応用特論		2	
Parallel Distributed & Internet Computing 並列・分散・インターネットコンピューティング		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
Software Engineering for Space Programs		2	
Techniques of Software Engineering for Embedded Systems 組み込みソフトウェア工学演習		2	
Sensing and Control Engineering 計測と制御		2	
High-Reliability Network Systems Engineering		1	
Theory of Evolving Network 成長するネットワークの理論		2	
Reliable System for Lunar and Planetary Explorations		2	
Object-Oriented Software Engineering		2	
Requirements Engineering		2	
Software Project Management		1	
Intellectual Property Management 知的財産管理		2	
Technical Writing in Software Engineering		2	
Human Aspects of Software Engineering		2	
Creativity Development: Approaches and Examples		1	
Best Practices in Embedded Software Development		2	
Software Security System Engineering		2	
Functional Safety of Critical Systems		1	
Knowledge Discovery and Data Mining		1	
Architecture-Oriented Software Development		2	
Computer-assisted Language Learning		2	
Semantic Web Technologies		1	
Computer-Aided Design of Integrated Circuits II 集積回路に対するコンピュータ支援設計 II		2	
Ubiquitous Network Systems and Applications ユビキタスネットワークシステムとアプリケーション		2	
Incorporating Security into Software Development Process		2	
Fundamental Data Analysis in Lunar and Planetary Explorations		2	
Practical Data Analysis with Lunar and Planetary Databases		2	
Computer-Aided Design of Integrated Circuits I 集積回路に対するコンピュータ支援設計 I		2	
Model-Driven Software Development II		1	
Fundamentals and Practices of High Quality and Safety-Critical Embedded Systems 安心・安全な組み込みシステムの基礎と実践		2	
Fundamentals and Practices of Functional Safety Related Systems 機能安全システムの基礎と実践		2	
Fundamentals and Practices of Project Management プロジェクトマネジメントの基礎と実践		2	
Software Agents and Agent Systems		2	

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
< Seminars > ＜セミナー科目＞			
Research Seminar I 研究セミナー I		4	
Research Seminar II 研究セミナー II		4	
Research Seminar III 研究セミナー III		4	
Research Seminar IV 研究セミナー IV		4	
Research Seminar V 研究セミナー V		4	
Research Seminar VI 研究セミナー VI		4	
Research Seminar VII 研究セミナー VII		4	
Special Research Seminar I 特別研究セミナー I		4	
Special Research Seminar II 特別研究セミナー II		4	
Special Research Seminar III 特別研究セミナー III		4	
Special Research Seminar IV 特別研究セミナー IV		4	
Special Research Seminar V 特別研究セミナー V		4	
Special Research Seminar VI 特別研究セミナー VI		4	
Special Research Seminar VII 特別研究セミナー VII		4	
Creative Factory Seminar I 創造工房セミナー I		4	
Creative Factory Seminar II 創造工房セミナー II		4	
Creative Factory Seminar III 創造工房セミナー III		4	
Creative Factory Seminar IV 創造工房セミナー IV		4	
Creative Factory Seminar V 創造工房セミナー V		4	
Creative Factory Seminar VI 創造工房セミナー VI		4	
Creative Factory Seminar VII 創造工房セミナー VII		4	
Creative Factory Seminar VIII 創造工房セミナー VIII		4	
IT Specialists Educational Seminars 教育セミナー		3	
IT Specialists Research Seminars / Conferences 研究セミナー・カンファレンス	3		
IT Specialists Tea Seminars / Contests Teaセミナー・コンテスト	2		

Course Name 授業科目の名称	CREDITS 単位数		
	REQ 必修	SEL 選択	OPT 自由
< Thesis Research > ＜研究科目＞			
[Graduate Department of Computer and Information Systems] 〔コンピュータ・情報システム学専攻〕			
Computer and Information Systems Research コンピュータ・情報システム学研究	6		
< Software Development Arena > ＜ソフトウェア開発アリーナ＞			
[Graduate Department of Information Technologies and Project Management] 〔情報技術・プロジェクトマネジメント専攻〕			
Software Development Arena I ソフトウェア開発アリーナ I	5		
Software Development Arena II ソフトウェア開発アリーナ II	5		
Software Development Arena III ソフトウェア開発アリーナ III	5		
Software Development Arena IV ソフトウェア開発アリーナ IV	5		

[Completion Requirements]

1. Graduate Department of Computer and Information Systems

(1) Students must earn at least a total of 30 credits, namely, 6 credits from one thesis research, 16 credits or more from regular courses, and 8 credits or more from seminars. Students who are advised to enroll in conversion courses can include up to 4 credits from conversion courses in the above-mentioned 16 credits of the regular courses.

(2) Students must earn 4 credits from one of the Creative Factory Seminars I to VIII, and 4 credits from one of the Research Seminars I to VII (Special Research Seminars I to VII). With regard to Special Research Seminars I to VII, students whose early completion of the Master's Program has been authorized shall register for one seminar from "Special Research Seminar I to Special Research Seminar VII" instead of "Research Seminar I to Research Seminar VII" as courses throughout a year. However, should those students be unable to complete the Master's Program in a period of time shorter than the academic residence requirement period, registration for Special Research Seminars shall be nullified.

Applicants for early completion of the Master's Program in their first-year enrollment in the Master's Program who cannot submit a document verifying their "outstanding achievements" by the designated date and wish to request early completion a half year later than the original request, will be required to make another application for early completion of the Program. Students other than those applicants mentioned above shall register for Research Seminars.

Applicants for early completion of the Master's Program in their second-year enrollment in the Master's Program who cannot submit a document verifying their "outstanding achievements" by the designated date, will be required to shift registration for "Special Research Seminars" to "Research Seminars" in the second year. The period of time they spent attending Special Research Seminars shall be included in the period of time for Research Seminars that they are required to complete.

2. Graduate Department of Information Technologies and Project Management

(1) Students must earn a total of at least 50 credits: 1) at least 20 credits from the Software Development Arena I through IV, 2) at least 22 credits from the regular courses, and 3) at least 8 credits from seminar courses.

(2) Students must earn a total of at least 8 credits: 1) 3 credits from Research Seminars/Conferences, 2) 2 credits from Tea Seminars/Contests and 3) 4 credits for one course from the Creative Factory Seminar I through VIII or 3 credits from the Educational Seminars.