

교과목 일람표

Course Type	Course Code	Course No	Course Title	L:L:C	Semester	Remarks
Basic Elective	EE105	35.105	Electrical Engineering: Changing the World	3:0:3	F	
	CoE202	B6.202	Fundamentals of Artificial Intelligence <Big data analysis and machine learning>	3:0:3	F	
Major Required	EE201	35.201	Circuit Theory	3:1:3	S, F	
	EE202	35.202	Signals and Systems	3:1:3	S, F	<input type="checkbox"/> MAS101
	EE204	35.204	Electromagnetics I	3:0:3	S, F	
	EE209	35.209	Programming Structure for Electrical Engineering	3:0:3	S, F	
	EE210	35.210	Probability and Introductory Random Processes	3:0:3	S, F	
	EE211	35.211	Introduction to Physical Electronics	3:0:3	S, F	
	EE305	35.305	Introduction to Electronics Design Lab.	1:6:3	S, F	<input type="checkbox"/> EE201,EE202,EE204,EE209
	EE405	35.405	Electronics Design Lab.	1:6:3	S, F	<input type="checkbox"/> EE305
Major Elective	EE205	35.205	Data Structures and Algorithms for Electrical Engineering	3:0:3	F	
	EE212	35.212	Electronics Design and Practice	1:6:3	F	
	EE213	35.213	Discrete Methods for Electrical Engineering	3:0:3	S	
	EE214	35.214	Machine Learning Basics and Practices	2:3:3	S, F	
	EE303	35.303	Digital System Design	3:1:3	S, F	
	EE304	35.304	Electronic Circuits	3:1:3	S, F	<input type="checkbox"/> EE201
	EE309	35.309	Advanced Programming Techniques for Electrical Engineering	3:0:3	F	<input type="checkbox"/> EE209
	EE312	35.312	Introduction to Computer Architecture	3:1:3	F	<input type="checkbox"/> EE303
	EE321	35.321	Communication Engineering	3:0:3	S, F	<input type="checkbox"/> EE202
	EE323	35.323	Computer Network	3:0:3	S	<input type="checkbox"/> EE209
	EE324	35.324	Introduction to Cloud Computing	3:0:3	F	<input type="checkbox"/> EE209,EE323
	EE326	35.326	Introduction to Information Theory and Coding	3:0:3	F	<input type="checkbox"/> EE210
	EE331	35.331	Introduction to Machine Learning	3:0:3	S	
	EE341	35.341	Electromagnetic Waves and Antennas	3:0:3	S	<input type="checkbox"/> EE204
	EE342	35.342	Electromagnetics II	3:1:3	F	<input type="checkbox"/> EE204,EE304
	EE352	35.352	Fundamentals of Photonics	3:0:3	F	
	EE362	35.362	Semiconductor Devices	3:0:3	S, F	
	EE372	35.372	Digital Electronic Circuits	3:0:3	F	
	EE381	35.381	Control System Engineering	3:0:3	S	<input type="checkbox"/> EE202
	EE391	35.391	Power Electronics Control	3:0:3	S	<input type="checkbox"/> EE202
	EE402	35.402	Future Society and Electrical Engineering	2:0:2	F	◎
	EE403	35.403	Analog Electronic Circuits	3:0:3	S, F	◎ <input type="checkbox"/> EE201,EE304
	EE411	35.411	Switching and Automata Theory	3:0:3	S	◎ <input type="checkbox"/> EE303
	EE412	35.412	Foundation of Big Data Analytics	3:0:3	F	◎ <input type="checkbox"/> MAS212,EE209,EE210
	EE414	35.414	Embedded Systems	3:1:3	F	◎ <input type="checkbox"/> EE303
	EE415	35.415	Operating Systems and System Programming for Electrical Engineering	3:0:3	S	◎ <input type="checkbox"/> EE209
	EE421	35.421	Communication Systems	3:0:3	S	<input type="checkbox"/> EE321
	EE424	35.424	Introduction to Optimization Techniques	3:0:3	F	◎ <input type="checkbox"/> MAS212

	EE425	35.425	Wireless Network	3:0:3	S	◎
	EE432	35.432	Digital Signal Processing	3:0:3	S,F	◎ □EE202
	EE441	35.441	Introduction to Fiber Optic Communication Systems	3:0:3	S	◎
	EE450	35.450	Technology Entrepreneurship	3:0:3	F	◎
	EE451	35.451	IT Venture Start-up	3:0:3	S	◎
	EE463	35.463	Semiconductor IC Technology	3:0:3	S	◎ □EE211,EE362
	EE464	35.464	Electrical Engineering for Green Energy	3:0:3	F	◎
	EE465	35.465	Heterogeneously Integrated Semiconductor Devices	3:0:3	S	◎ □EE211,EE362
	EE466	35.466	Introduction to Biomedical Electronics	3:0:3	F	◎
	EE467	35.467	Sensor Electronics	3:0:3	S	◎ □EE211
	EE474	35.474	Introduction to Multimedia	3:0:3	S	◎ □EE202
	EE476	35.476	Audio-Visual Perception Model	3:0:3	F	◎ □EE202
	EE477	35.477	Database and Big Data Systems	3:0:3	S	◎
	EE478	35.478	Introduction to Multi-disciplinary Robot Engineering	3:0:3	F	◎
	EE479	35.479	Scientific Computing and Data	3:0:3	S	◎
	EE480	35.480	Basics of Quantum Information and Quantum Computing	3:0:3	S	◎
	EE481	35.481	Intelligent Systems	3:0:3	S	◎ □EE381
	EE485	35.485	Special Topics in Electronic Engineering I	1:0:1	S, F	◎
	EE486	35.486	Special Topics in Electronic Engineering II	2:0:2	S, F	◎
	EE488	35.488	Special Topics in Electrical Engineering	3:0:3	S, F	
Research	EE490	35.490	B.S. Thesis Research	0:6:3	S, F	
	EE495	35.495	Individual Study	0:6:1		
	EE496	35.496	Seminar	1:0:1	S	

※ □: Prerequisite ◎: Course mutually recognized by undergraduate and graduate programs
 ※ Course classification, course title, and mutual recognition of credits may differ according to the effective year of the requirements.

- Graduate

Course Type	Course Code	Course No	Course Title	L:L:C	Semester	Remarks
Elective	EE509	35.509	Technical Writing	1:0:1	S	◎
	EE511	35.511	Computer Architecture	3:0:3	S	◎ □EE303,EE312
	EE513	35.513	Networked Systems and Security	3:0:3	S	◎ □EE209,EE323
	EE515	35.515	Security of Emerging Systems	3:0:3	F	◎ □EE323,EE415
	EE516	35.516	Embedded Software	1:6:3	F	◎ □EE209
	EE520	35.520	Telecommunication Networks	3:0:3	S	◎
	EE522	35.522	Communication Theory	3:0:3	F	◎ □EE412
	EE523	35.523	Convex Optimization Techniques	3:0:3	S	◎ □MAS212,EE424

Course Type	Course Code	Course No	Course Title	L:L:C	Semester	Remarks
	EE527	35.527	Data Communication	3:0:3	S	⊙
	EE528	35.528	Engineering Random Processes	3:0:3	S,F	⊙
	EE529	35.529	Wireless Communications	3:0:3	F	⊙ □EE421
	EE531	35.531	Statistical Learning Theory	3:0:3	S	⊙ □EE210,CS101
	EE532	35.532	Introduction to Brain IT	3:0:3	S	⊙
	EE533	35.533	Digital Speech Processing	3:0:3	S	⊙ □EE202
	EE534	35.534	Pattern Recognition	3:0:3	F	⊙
	EE535	35.535	Digital Image Processing	3:0:3	S	⊙ □EE432
	EE538	35.538	Neural Networks	3:0:3	F	⊙ □EE202,210
	EE539	35.539	Nonlinear Statistical Signal Processing	3:0:3	F	⊙
	EE541	35.541	Electromagnetic Theory	3:0:3	S	⊙
	EE542	35.542	Microwave Engineering	3:1:3	F	⊙ □EE204
	EE543	35.543	Antenna Engineering	3:1:3	S	⊙
	EE546	35.546	Fields and Waves	3:0:3	F	⊙
	EE547	35.547	Introduction to Quantum Information Processing	3:0:3	F	⊙
	EE548	35.548	Matrix Computations for Signal Processing	3:0:3	F	⊙
	EE552	35.552	Quantum Computing	3:0:3	S	⊙
	EE555	35.555	Optical Electronics	3:0:3	S	⊙
	EE561	35.561	Introduction to VLSI Devices	3:0:3	S	⊙ □EE362
	EE563	35.563	Display Engineering	3:0:3	S	⊙
	EE565	35.565	Modern Physics for Engineers	3:0:3	S	⊙
	EE566	35.566	MEMS in EE Perspective	3:0:3	S or F	⊙
	EE567	35.567	Photovoltaic Power Generation	3:0:3	S	⊙ □EE211
	EE568	35.568	Introduction to Organic Electronics	3:0:3	F	⊙
	EE569	35.569	Nanobioelectronics	3:0:3	F	⊙
	EE571	35.571	Advanced Electronic Circuits	3:0:3	S	⊙ □EE304,EE403
	EE573	35.573	Introduction to VLSI Systems	3:0:3	S	⊙
	EE574	35.574	Computer Aided Design of VLSI Circuits and Systems	3:0:3	S	⊙
	EE575	35.575	Entertainment Platform	3:0:3	F	⊙
	EE576	35.576	Low Noise Electronic Circuits	3:0:3	F	⊙ □EE381,EE403
	EE581	35.581	Linear Systems	3:0:3	S	⊙ □EE381
	EE582	35.582	Digital Control	3:1:3	S	⊙ □EE381
	EE585	35.585	Mobile Robotics and Autonomous Navigation	3:0:3	F	⊙
	EE591	35.591	Introduction to Electric Vehicles	3:1:3	S	⊙
	EE594	35.594	Power Electronics Systems	3:0:3	F	⊙ □EE391
	EE595	35.595	Special Topics in Electrical and Computer Engineering	3:0:3	S,F	⊙
	EE612	35.612	Discrete Event System Modeling and Simulation	3:0:3	F	
	EE613	35.613	Distributed Computing Systems	3:0:3	S	□EE324
	EE614	35.614	Service Oriented Computing Systems	3:0:3	F	□EE324

Course Type	Course Code	Course No	Course Title	L:L:C	Semester	Remarks
	EE616	35.616	Advanced Big data – AI Integration	3:0:3	F	
	EE618	35.618	Advanced Computer Networking and Cloud Computing	3:0:3	S	
	EE619	35.619	Mathematical Foundations of Reinforcement Learning	3:0:3	S	
	EE621	35.621	Coding Theory	3:0:3	S	<input type="checkbox"/> EE522,EE528
	EE622	35.622	Detection and Estimation	3:0:3	F	
	EE623	35.623	Information Theory	3:0:3	F	<input type="checkbox"/> CC511,EE528
	EE624	35.624	Cellular Communication Systems and Protocols	3:0:3	F	
	EE626	35.626	Advanced Communication Theory	3:0:3	S	<input type="checkbox"/> EE522,EE529
	EE627	35.627	Performance Analysis of Communication Networks	3:0:3	S	
	EE628	35.628	Video Compression and Applications	3:0:3	F	<input type="checkbox"/> EE432
	EE631	35.631	Advanced Digital Signal Processing	3:0:3	S	<input type="checkbox"/> EE432,EE528
	EE635	35.635	Functional Brain Imaging	3:0:3	F	
	EE636	35.636	Digital Video Processing	3:0:3	F	
	EE637	35.637	Speech & Audio Coding Theory	3:0:3	S	<input type="checkbox"/> EE432
	EE639	35.639	Neuro-Robotics	3:0:3	F	<input type="checkbox"/> EE581
	EE641	35.641	Monolithic Microwave Integrated Circuits	3:0:3	S	<input type="checkbox"/> EE204,EE304
	EE643	35.643	Millimeter-wave Integrated Circuit (mmWIC) Design	3:0:3	S	
	EE645	35.645	Wireless Transceiver Systems	3:0:3	S	
	EE647	35.647	Nano-Photonics	3:0:3	S	
	EE650	35.650	Optimization in Communication Network	3:0:3	S	
	EE652	35.652	Fiber-Optic Communications	3:0:3	F	<input type="checkbox"/> EE204
	EE654	35.654	MIMO Wireless Communications	3:0:3	F	
	EE655	35.655	Economics in Communication Network	3:0:3	S	
	EE657	35.657	Local Area Network/Metropolitan Area Network (LAN/MAN)	3:0:3	S	
	EE658	35.658	Queueing theory with applications	3:1:3	F	
	EE659	35.659	Wireless Communication Protocols and Analysis	3:0:3	S	
	EE661	35.661	Solid State Physics	3:0:3	F	
	EE663	35.663	High Frequency Electronic Devices	3:0:3	S or F	<input type="checkbox"/> EE362
	EE664	35.664	Applied Optics for Display Devices	3:0:3	S	<input type="checkbox"/> EE204
	EE665	35.665	CMOS Front-end Process Technology	3:0:3	F	<input type="checkbox"/> EE211,EE362,EE 463
	EE666	35.666	Optoelectronic Semiconductor Devices and Their Applications	3:0:3	F	<input type="checkbox"/> EE362
	EE667	35.667	Multiple View Geometry	3:0:3	S	
	EE672	35.672	Future and Technology : New Media technology and Business	3:0:3	F	
	EE675	35.675	Digital Computer Arithmetic	3:0:3	S	
	EE676	35.676	Analog Integrated Circuits	3:0:3	F	<input type="checkbox"/> EE571
	EE678	35.678	Digital Integrated Circuits	3:0:3	F	
	EE681	35.681	Nonlinear Control	3:0:3	F	<input type="checkbox"/> EE581
	EE682	35.682	Intelligent Control Theory	3:0:3	F	<input type="checkbox"/> EE581
	EE683	35.683	Robot Control	3:0:3	F	<input type="checkbox"/> EE581

Course Type	Course Code	Course No	Course Title	L:L:C	Semester	Remarks
	EE688	35.688	Optimal Control Theory	3:0:3	F	<input type="checkbox"/> EE581
	EE691	35.691	Telecom. Network Management	3:0:3	S	
	EE692	35.692	Parallel and Distributed Computation in Communication Network	3:0:3	F	
	EE696	35.696	Telecommunication Software Design	3:1:3	F	<input type="checkbox"/> EE527
	EE722	35.722	Advanced Signal Detection	3:0:3	F	<input type="checkbox"/> EE622
	EE727	35.727	Broadband Network Design and Analysis	3:0:3	F	
	EE731	35.731	Adaptive Signal Processing	3:0:3	S	<input type="checkbox"/> EE432,EE528
	EE733	35.733	Multirate Signal Processing	3:0:3	F	<input type="checkbox"/> EE432
	EE734	35.734	Image Understanding	3:0:3	S	<input type="checkbox"/> EE535
	EE735	35.735	Computer Vision	3:0:3	F	<input type="checkbox"/> EE535
	EE737	35.737	Medical Imaging Technology	3:0:3	S	
	EE738	35.738	Speech Recognition Systems	3:0:3	S	<input type="checkbox"/> EE202
	EE739	35.739	Cognitive Information Processing	3:0:3	F	
	EE742	35.742	Ray Analysis for Electromagnetic Scattering Problems	3:0:3	F	
	EE745	35.745	EMI / EMC Design and Analysis	3:0:3	S	<input type="checkbox"/> EE204,EE304
	EE746	35.746	Radar Systems	3:0:3	F	
	EE755	35.755	Advanced Coding Theory	3:0:3	F	<input type="checkbox"/> EE621
	EE756	35.756	Advanced Information Theory	3:0:3	F	<input type="checkbox"/> EE623
	EE757	35.757	Nonlinear Fiber Optics	3:0:3	F	
	EE758	35.758	Optical Networks	3:0:3	F	<input type="checkbox"/> EE441,EE520,EE527
	EE762	35.762	Advanced MOS Device Physics	3:0:3	F	<input type="checkbox"/> EE362
	EE764	35.764	Quantum Engineering for Nanoelectronic Devices	3:0:3	F	<input type="checkbox"/> EE565
	EE766	35.766	Plasma Electronics	3:0:3	F	
	EE768	35.768	Flexible Electronics	3:0:3	F	
	EE772	35.772	Electronic Circuits for Green Energy	3:0:3	F	
	EE773	35.773	Bio-Medical CMOS IC Design	3:0:3	S	
	EE783	35.783	Adaptive Control Theory	3:0:3	S	<input type="checkbox"/> EE581
	EE785	35.785	Robust Control Theory	3:0:3	S	<input type="checkbox"/> EE581,EE681
	EE788	35.788	Robot Cognition and Planning	3:0:3	S	<input type="checkbox"/> EE682,EE683
	EE790	35.790	Memory and SoC Technology	3:0:3	F	
	EE791	35.791	Power Conversion Circuits and Systems	3:0:3	S	<input type="checkbox"/> EE391,EE594
	EE793	35.793	Systems and Applications of Artificial Intelligence and Machine Learning	3:0:3	S	
	EE807	35.807	Special Topics in Electrical Engineering	3:0:3	S,F	
	EE808	35.808	Special Topics in Electronic Engineering I	1:0:1	S,F	
	EE809	35.809	Special Topics in Electronic Engineering II	2:0:2	S,F	
	EE817	35.817	Special Topics in Computer Engineering	3:0:3	S,F	
	EE827	35.827	Special Topics in Communication	3:0:3	S,F	
	EE837	35.837	Special Topics in Signal Processing	3:0:3	S,F	
	EE838	35.838	Special Topics in Image Engineering	3:0:3	S,F	
	EE847	35.847	Special Topics in	3:0:3	S,F	

Course Type	Course Code	Course No	Course Title	L:L:C	Semester	Remarks
			Electromagnetics			
	EE857	35.857	Special Topics in Optical Engineering	3:0:3	S,F	
	EE867	35.867	Special Topics in Physical Electronics	3:0:3	S,F	
	EE868	35.868	Special Topics in Solid-State Physics	3:0:3	S,F	
	EE877	35.877	Special Topics in Integrated Circuits	3:0:3	S,F	
	EE878	35.878	Special Topics in VLSI	3:0:3	S,F	
	EE887	35.887	Special Topics in Robotics	3:0:3	S,F	
	EE888	35.888	Special Topics in Control Theory	3:0:3	S,F	
	EE897	35.897	Special Topics in Power Electronics	3:0:3	S,F	
	EE898	35.898	Special Topics in Intelligent Information Processing	3:0:3	S,F	
연구	EE960	35.960	M.S. Thesis Research		S,F	
	EE965	35.965	M.S. Individual Study	0:6:1		
	EE966	35.966	M.S. Seminar	1:0:1	S,F	
	EE969	35.969	M.S. Thesis Seminar	0.5:0:0.5	S,F	
	EE980	35.980	Ph.D. Thesis Research		S,F	
	EE986	35.986	Ph.D. Seminar	1:0:1	S,F	
	EE989	35.989	Ph.D. Thesis Seminar	0.5:0:0.5	S,F	

※ □: Prerequisite ◎: Course mutually recognized by undergraduate and graduate programs
 ※ Course classification, course title, and mutual recognition of credits may differ according to the effective year of the requirements.

Substitute Course List

Substitute courses in the department					
Category	Courses currently offered		Courses not currently offered		
	Course no.	Course title	Course no	Course title	Remark
Undergraduate	EE105	Electrical Engineering: Changing the World	EE105	Present and Future of Electronics Engineering	Change in Course Title
Undergraduate	EE204	Electromagnetics	EE204	Electromagnetics I	Change in Course Title
Undergraduate	EE205	Data Structures and Algorithms for Electrical Engineering	EE205	Data Organization for Engineering Application	Change in Course Title
Undergraduate	EE209	Programming Structure for Electrical Engineering	EE209	Programming for Electrical Engineering	Change in Course Title
Undergraduate	EE210	Probability and Introductory Random Processes	EE423	Probability and Introductory Random Processes for Electrical Engineers	Change in Course Code and Title
Undergraduate	EE211	Introduction to Physical Electronics	EE302	Introduction to Physical Electronics	Change in Course Code
Undergraduate	EE303	Digital System Design	EE203	Digital System Design	Change in Course Code
Undergraduate	EE304	Electronic Circuits	EE206	Electronic Circuit I	Change in Course Title
Undergraduate	EE304	Electronic Circuits	EE206	Electronic Circuits	Change in Course Code

Undergraduate	EE305	Introduction to Electronics Design Lab.	EE305	Electronics Lab. I	Change in Course Title
Undergraduate	EE305	Introduction to Electronics Design Lab.	EE305	Analog Electronics Design Lab.	Change in Course Title
Undergraduate	EE324	Network Programming	EE413	Networking Design and Programming	Change in Course Code and Title
Undergraduate	EE341	Electromagnetic Waves and Antennas	EE341	Electromagnetics II	Change in Course Title
Undergraduate	EE362	Semiconductor Devices	EE461	Semiconductor Devices	Change in Course Code
Undergraduate	EE372	Digital Electronic Circuits	EE372	Integrated Circuits Design	Change in Course Title
Undergraduate	EE391	Power Electronics Control	EE391	Electronic Control of Electric Machines	Change in Course Title
Undergraduate	EE403	Analog Electronic Circuits	EE301	Electronic Circuits II	Change in Course Title
Undergraduate	EE403	Analog Electronic Circuits	EE301	Analog circuits	Change in Course Code
Undergraduate	EE415	Operating Systems and System Programming for Electrical Engineering	EE311	Operating Systems and System Programming for Electrical Engineering	Change in Course Code
Undergraduate	EE421	Communication Systems	EE422	Communication Systems	Change in Course Code
Undergraduate	EE421	Communication Systems	EE421	Wireless Communication Systems	Change in Course Title
Undergraduate	EE452	Fundamentals of Photonics)	EE352	Fundamentals of Photonics)	Change in Course Title
Graduate	EE509	Technical Writing	EE990	Technical Writing	Change in Course Code
Graduate	EE509	Technical Writing	EE968	Technical Writing	Change in Course Code
Graduate	EE513	Network Systems and Security	EE513	Operating Systems for Networked Systems	Change in Course Title
Graduate	EE522	Communication Theory	EE522	Advanced Communication Systems	Change in Course Title
Graduate	EE528	Engineering Random Processes	EE521	Random Processes	Change in Course Code and Title
Graduate	EE575	Entertainment Platform	EE713	Entertainment Platform	Change in Course Code
Graduate	EE622	Detection and Estimation	EE622	Signal Detection Theory	Change in Course Title
Graduate	EE624	Cellular Communication Systems and Protocols	EE624	Mobile Communication Systems	Change in Course Title
Graduate	EE628	Video Compression and Applications	EE628	Visual Communication Systems	Change in Course Title
Graduate	EE650	Optimization in Communication Networks	EE726	Optimization in Communication Networks	Change in Course Code
Graduate	EE659	Wireless Communication Protocols and Analysis	EE659	Wireless Communication Network	Change in Course Title
Graduate	EE665	CMOS Front-end Process Technology	EE564	Integrated Circuit Process	Change in Course Code and Title
Graduate	EE672	Future and Technology: New Media technology and Business Strategies	EE572	Future and Technology: New Media technology and Business Strategies	Change in Course Code
Graduate	EE679	Low-noise Low-power Analog Circuits	EE679	Analog and Mixed Signal Circuits for Communication	Change in Course Title
Graduate	EE688	Optimal Control Theory	EE786	Optimal Control Theory	Change in Course Code
Graduate	EE692	Parallel and Distributed Computation in Communication Network	EE724	Parallel and Distributed Computation in Communication Network	Change in Course Code

Graduate	EE696	Telecommunication Software Design	EE524	Telecommunication Software Design	Change in Course Code
Graduate	EE737	Medical Imaging Technology	EE737	Imaging Systems	Change in Course Title
Graduate	EE966	M.S. Seminar<Colloquium>	EE969	M.S. Thesis Seminar	Course abolished
Graduate	EE986	Ph.D. Seminar<Colloquium>	EE989	Ph.D. Thesis Seminar	Course abolished

Substitute courses in other departments					
Category	Courses offered by the department		Courses offered by other departments		
	Course Code	Course Title	Course Code	Course Title	Remark
Under graduate	EE303	Digital System Design	CS211	Digital System and Lab.	unidirectional
Under graduate	EE312	Introduction to Computer Architecture	CS311	Computer Organization	bidirectional
Under graduate	EE450	Technology Entrepreneurship	MSB450	Entrepreneurship & Venture Business	bidirectional
Under graduate	EE451	IT Venture Start-up	MSB451	Venture Formation Practice	bidirectional
Graduate	EE612	Discrete Event System Modeling and Simulation	CS655	System Modeling and Analysis	bidirectional
Graduate	EE534	Pattern Recognition	CS676	Pattern Recognition	bidirectional
Graduate	EE672	Future and Technology : New Media technology and Business	MSB556	Future and Technology: New Media technology and Business Strategies	bidirectional