S²PC

November 15-17, 2024
Ajou University
Suwon, Korea

8th Symposium on Semiconductor Power Conversion

Sponsors

Power Conversion Committee, Korean Institute of Power Electronics (KIPE)

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S²PC Symposium on Semiconductor Power Conversion

Suwon, Korea **November 15-17, 2024**

General Chairman

Kyo-Beum Lee, Ajou University, Korea

Organizers

Jee-Hoon Jung, Ulsan National Institute of Science and Technology, Korea

Younghoon Cho, Konkuk University, Korea

Jae-Suk Lee, Jeonbuk National University, Korea

Kazunori Hasegawa, Kyushu Institute of Technology, Japan

Shohei Komeda, Tokyo University of Marine Science and Technology, Japan

Shotaro Takahashi, Akita University, Japan

Kun-Che Ho, National Formosa University, Taiwan

Ching-Jan Chen, National Taiwan University, Taiwan

Kuo-Yuan Lo, National Kaohsiung University of Science and Technology, Taiwan

Venue

Ajou University, Suwon, Korea

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IEE of Japan-Industry Application Society (IEEJ-IAS)

IEEE IAS/PELS Taipei Chapter

Engineering Research Institute, Ajou University

Supporters

Ajou University

Symposium Site

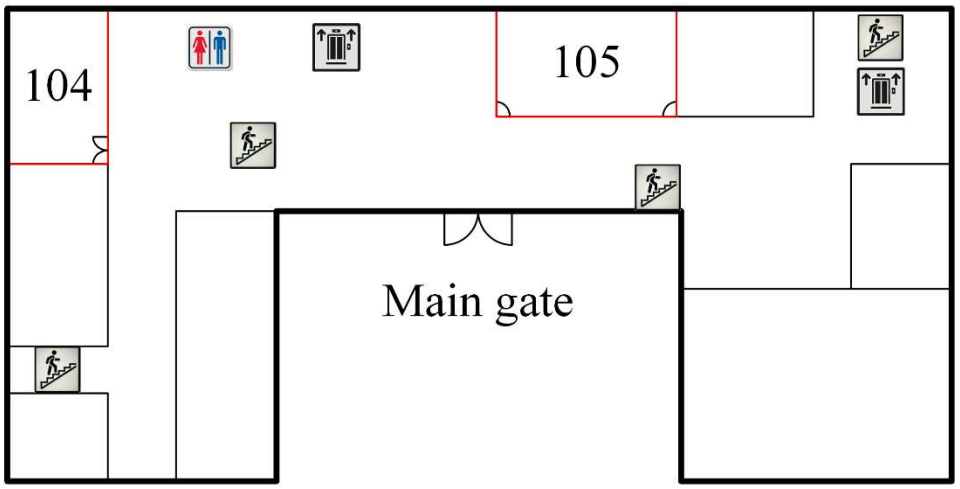
Hyegang Hall
Ajou University, Suwon, Korea

Parking information

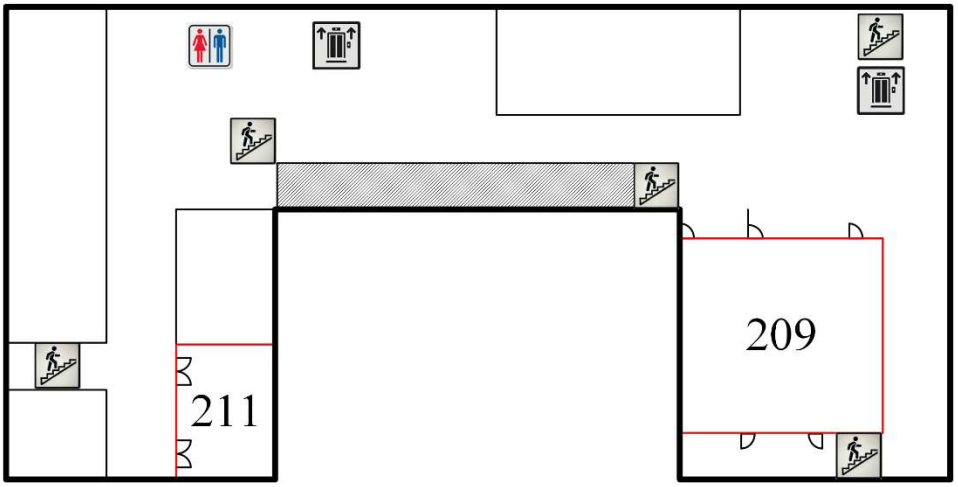
- Parking lots near building, on-street parking places near building
- One day free parking permit can be taken at the registration desk.

Floor map of Hyegang Hall

1st floor



2nd floor



- Room 104: Conference room for meeting and discussion
- Room 105: Dining room
- Room 209: Oral session room for presentations
- Room 211: VIP room

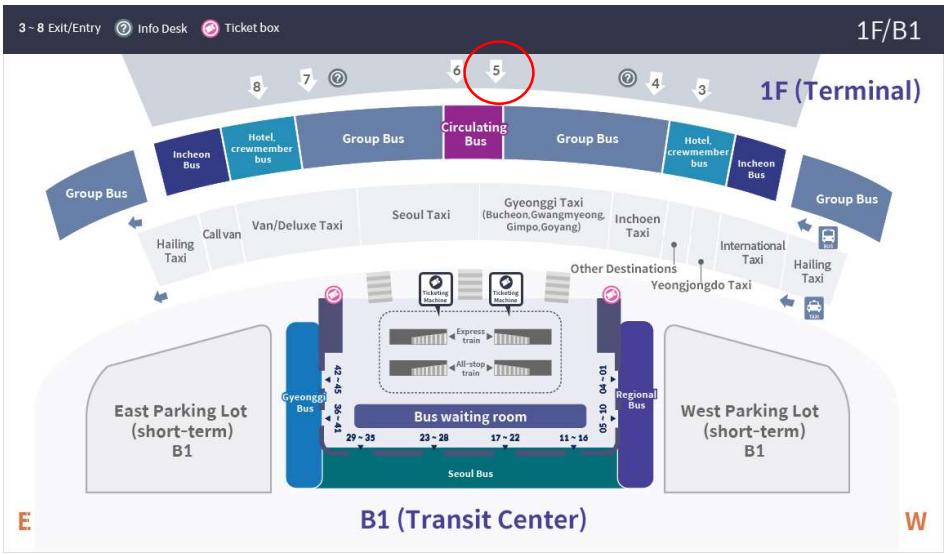
Symposium Schedule

<table>
<tr><th colspan="3">Day 1 (November 15th, Friday)</th></tr>
<tr><th>Time</th><th>Schedule</th><th>Venue</th></tr>
<tr><td rowspan="2">12:30 ~ 14:00</td><td>Meeting at the airport</td><td>▪ Departure time from Incheon International Airport: 12:30
▪ Departure time from Gimpo International Airport: 14:00
▪ Shuttle buses will operate from the airport to Hyundai MOBIS R&D center located in Uiwang.</td></tr>
<tr><td>Meeting at the
Ajou University,
Woncheon Hall</td><td>▪ Departure time from Ajou University: 14:00.
▪ Shuttle buses will operate from the Ajou university to Hyundai MOBIS R&D center located in Uiwang.</td></tr>
<tr><td>14:00 ~ 15:00</td><td colspan="2">Move to Hyundai MOBIS R&D center for technical tour</td></tr>
<tr><td>15:00 ~ 16:30</td><td>Technical tour</td><td>Hyundai MOBIS R&D center
(Only for attendees
from Japan and Taiwan)</td></tr>
<tr><td>16:30 ~ 18:00</td><td colspan="2">Hotel check-in and move to reception restaurant</td></tr>
<tr><td>18:00 ~ 20:00</td><td>Welcome reception</td><td>Seo-Seo Galbi
(Korean traditional barbecue)</td></tr>
</table>

The Pick-up location for the technical tour to Hyundai MOBIS R&D center

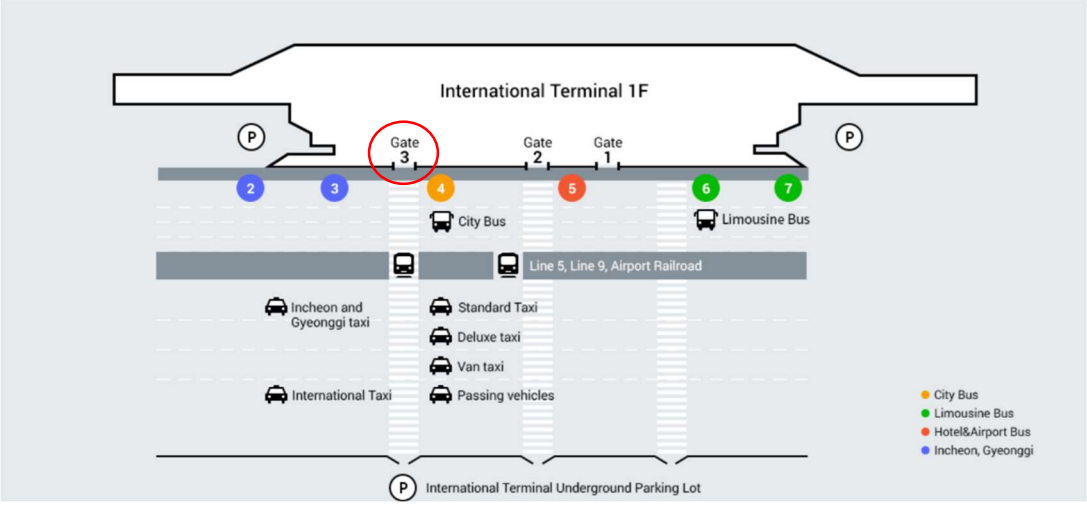
1. Pick-up location #1 : Incheon International Airport (Gate 5 of Terminal 2)

- Meeting time : 12:30, November 15th, Friday



2. Pick-up location #2 : Gimpo International Airport (Gate 3 of International Terminal)

- Meeting time : 14:00, November 15th, Friday



Symposium Schedule

Day 2 (November 16th, Saturday)		
Time	**Schedule**	**Venue**
09:00 ~ 09:30	**Registration**	**Hyegang Hall, Ajou University**
09:30 ~ 10:00	**Opening ceremony**	
10:00 ~ 11:30	**Oral session**	
11:30 ~ 13:30	**Lunch**	
13:30 ~ 15:00	**Poster session**	
15:00 ~ 16:00	**Committee meeting**	
18:00 ~ 20:00	**Banquet**	**Ibis Ambassador Suwon Hotel**

Symposium Schedule

Day 3 (November 17th, Sunday)		
Time	**Schedule**	**Venue**
10:30 ~ 12:00	**Cultural tour**	**Hwaseong Fortress (Korean palace)**
12:00 ~ 13:00	**Farewell lunch**	**Dosirak (lunch box) Shuttle buses will operate from Hwaseong Fortress to Seoul Station.**

****Schedule and venue are subject to change.**

Registration

1. Registration

- All participants must complete online registration by September 15, 2024.
- Full registration : USD 400 / KRW 500,000

(Student and life member : USD 350 / KRW 400,000)

- Payment methods : Visa, MasterCard, and JCB

2. Cancellation and Refund Policy

- Refund or cancellation requests must be submitted in writing by September 14, 2024.
- A deduction of USD 100 (KRW 130,000) will be applied to each refund.
- Please submit all refund/cancellation requests to jaesuk@jbnu.ac.kr

3. Payment Policy

- Payment by credit card is available only through the online procedure.
- All service charges on credit card are to be paid by registrants.
- Actual debit amount is subject to change according to the exchange rate.

Technical Program

Saturday, November 16, 2024

09:00 – 09:30	**Registration**
09:30 – 10:00	**Opening Ceremony (Hyegang Hall)**
10:00 – 11:30	**Oral Session (Hyegang Hall)**

Session Chairs: *Keiji Wada, Tokyo Metropolitan University, Japan*
Cheng-Yu Tang, National Taipei University of Technology, Taiwan
Young-Doo Yoon, Hanyang University, Korea

10:00 ~ 10:30
Over-Current Protection for Three-Phase Inverter with GaN Devices Considering Resonant Current at DC-Link
Dr. Hiroki Takahashi, Yaskawa Electric Corporation, Japan

10:30 ~ 11:00
Power Density and Efficiency Improvement on Dual-Inverter Motor Drives
Prof. Shih-Chin Yang, National Taiwan University, Taiwan

11:00 ~ 11:30
Motor emulation based on high-fidelity model
Prof. Joon-Hee Lee, Ulsan National Institute of Science and Technology, Korea

11:30 – 13:30	**Lunch (Hyegang Hall)**
13:30 – 15:00	**Poster session (Hyegang Hall)**
15:00 – 16:00	**Committee meeting (Hyegang Hall)**
16:00 – 18:00	**Rest time and moving to the banquet place**
18:00 – 20:00	**Banquet (Ibis Ambassador Suwon Hotel)**

13:30 – 15:00 Poster Session (Hyegang Hall)

Session Chairs: *Tomoyuki Mannen, University of Tsukuba, Japan*
Ying-Ting Huang, National Taipei University of Technology, Taiwan
Younghoon Cho, Konkuk University, Korea

TP1	Efficiency-Based Sensorless Detection of Metallic Foreign Objects in Wireless Power Transfer Systems *Chin-Han Ho, Jia-Wei Zhang, Zhih-Shin Zhang (National Taiwan University of Science and Technology, Taiwan), Kun-Che Ho (National Formosa University, Taiwan) and Yi-Feng Luo (National Taiwan University of Science and Technology, Taiwan)*
TP2	Design and Implementation of a Switched-Capacitor Resonant Converter with High Step-Down Voltage Ratio *Yu-Qing She, KUOYUAN LO (National Kaohsiung University of Science and Technology, Taiwan)*
JP1	A Radial Force Mode Control in IPMSM using 6-Phase Motor *Shojiro Fujita and Kan Akatsu (Yokohama National University, Japan)*
JP2	A Study on Visualizing Noise Current on AC–DC Converter by Time-synchronized Near Magnetic Field Distribution *Kazuki Nishatani, Takaaki Ibuchi, Tsuyoshi Funaki (Osaka University, Japan) and Ken Matsuura (TDK Corporation, Japan)*
JP3	Clarification of Acceptable PWM Voltage Detection Delay for Current Source Type Electric Motor Emulator *Gensui Tanaka, Hiroki Watanabe and Junichi Itoh (Nagaoka University of Technology, Japan)*
KP1	Modulated Model Predictive Current Control Strategy of Single Phase Three-Level Converter *Kwonhoon Kim and Younghoon Cho (Konkuk University, Korea)*
KP2	Speed Estimation Error Compensation Using Extended Back-EMF Sensorless Algorithm for Low-Speed Washing Machine Motors *Yujin Shin, Jaehyeok Jang, Jung-yong Lee and Younghoon Cho (Konkuk University, Korea)*

TP3	Investigation on the PI Controller based Three-Phase Phase-Locked Loop *Yun-Sheng Tsai, Zhi-Wei Hu, Yu-Chen Su (National Tsing Hua University)*
TP4	A Low Output-Ripple Buck Converter with Integrated Ripple Cancellation Method *Pang-Jung Liu, Chen-Yu Liao and Shao-Jin Ding (National Taipei University of Technology, Taiwan)*
JP4	Fourier Series Analysis of an LLC Resonant Converter Operating Below Resonance *Kazuto Takagi (GS Yuasa International Ltd., Japan)*
JP5	An Experimental Study on a 9-level DAB Converter for Expansion of Efficient Operation Range *Koya Tsutsumi and Hidemine Obara (Yokohama National University, Japan)*
JP6	Ultra-Wideband Virtual Impedance Circuit for Grid-Connected Inverter *Riki Yamazaki, Hiroki Watanabe, Junichi Itoh and Keisuke Kusaka (Nagaoka University of Technology, Japan)*
KP3	Reinforcement Learning-Based Time-Optimal Trajectory Development for Permanent Magnet Synchronous Motor Drives under Voltage and Current Constraints *Jeonghan Lee and Jae Suk Lee (Jeonbuk National University, Korea)*
KP4	Investigation of Overvoltage in Motor Drive Systems by Voltage Reflection *Sung-Oh Kim and Kyo-Beum Lee (Ajou University, Korea)*
TP5	Design and Implementation of a Switched-Capacitor Resonant Converter with High Step-Down Voltage Ratio *Yu-Qing She and KUOYUAN LO (National Kaohsiung University of Science and Technology, Taiwan)*
TP6	Analysis of Power Loss and the Influence of Secondary Parasitic Capacitance on a ZVS Phase-Shift Full-Bridge Converter *Li Pin-Hsien and Yu-Chen Liu (National Taipei University of Technology, Taiwan)*

JP7	Proposal for Dead-Time Compensation Control, Using "Calculated-Current" Suitable for Low Inductance Motors *Keita Yonemura, Yuto Onji, Keiichiro Kondo (Waseda University, Japan), Kohei Aiso (Shibaura Institute of Technology, Japan) and Yasuaki Aoki (Denso Corporation, Japan)*
JP8	Fast Inductance Estimation of Coupled Inductors using Machine Learning *Jin Onodera, Ryosuke Ota and Keiji Wada (Tokyo Metropolitan University, Japan)*
JP9	Design of an Input/Output Passive Common-Mode Noise Canceller Considering Iron Loss Characteristics of Magnetic Materials *Ryosuke Kanbayashi and Shotaro Takahashi (Akita University, Japan)*
KP5	Analysis of Junction Temperature in SiC Inverter Systems with Variable Modulation Schemes *Byeong Woo Kang and Kyo-Beum Lee (Ajou University, Korea)*
KP6	Voltage Fluctuation Reduction in Dual Active Bridge Converter Employing Spread Spectrum Modulation *Gwon-Gyo Jung, Jun-Suk Lee and Jee-Hoon Jung (Ulsan National Institute of Science and Technology, Korea)*
TP7	Phase Shift Half-Bridge LLC Resonant Converter with Voltage Doubler Output *Ching-Chun Chuang, Bo-Hao Li (National Kaohsiung University of Science and Technology, Taiwan), Jian-Min Wang, Sen-Tung Wu (National Formosa University, Taiwan) and Chun-Yu Hsiao (Tatung University, Taiwan)*
TP8	Optimizing Core Loss Calculations with Deep Neural Network *Jian-De Li, Yun-Shan Hsieh, Tzu-Chieh Hsu, Li-Chen Yu (National Taipei University of Technology, Taiwan) and Yu-Chen Liu (Taipei Tech National Taipei University of Technology, Taiwan)*
JP10	Study on Novel In-wheel Actuator Using MagnetoRheological Elastomer *Kan Akatsu and Rakibul Islam (Yokohama National University, Japan)*

JP11	Topology Optimization for Reducing Current Imbalance in Circuit with Multi-Parallel GaN Devices *Yoshinori Okubo, Katsuya Nomura (Kwansei Gakuin University, Japan), Takashi Sawada and Koji Shiozaki (Nagoya University, Japan)*
JP12	Effect of Grounding Condition on Common-Mode Noise in Motor Drive System Using a Three-Phase Inverter *Shun Nakayama, Haruya Asano and Katsuya Nomura (Kwansei Gakuin University, Japan)*
KP7	Analysis of Power Loss in Dual Inverters with Isolated Source for Open-End Winding Permanent Magnet Synchronous Motor using Discontinuous Modulation Region *Sang Jun Lee, Jae Seong Kim and Kyo-Beum Lee (Ajou University, Korea)*
KP8	EMI Mitigation Performance and Side-Effects of Spread Spectrum Modulation in a Single-Phase Boost PFC *YoungJoon Song and Jee-Hoon Jung (Ulsan National Institute of Science and Technology, Korea)*
KP9	Parameter Identification of Induction Machine Based on Finite Element Analysis *Nuel Oh and Joon-Hee Lee (Ulsan National Institute of Science and Technology, Korea)*
TP9	Three-Phase Three-Level T-Type Inverter for Grid-Following Applications *Ching-Tien Fang and Yao-Ching Hsieh (National Sun Yat-sen University, Taiwan)*
TP10	Power Tracking Control Strategy for AHO-Based dVOC Inverter in Grid-Connected Mode Using Linear Quadratic Regulator *Hsin-Hsuan Tsai, Katherine Kim and Yaow-Ming Chen (National Taiwan University, Taiwan)*
TP11	High-Frequency High-Power, Three-Phase CLLC Resonant Converter with Integrated Transformer *KUO-YU TSENG, Yun-Yen Chen and Huang-Jen Chiu (National Taiwan University of Science and Technology, Taiwan)*

JP13	Efficiency Comparison of Equal and Unequal DC Capacitor Voltages in a H-Bridge Modular Cascaded Linear Amplifier Comprising Four Cells *Shunsuke Ishida and Hidemine Obara (Yokohama National University, Japan)*
JP14	Accelerated Ageing Test of 35-V Polymer Solid Capacitors With Different DC-bias Voltages for Lifetime Estimation *Kento Imai and Kazunori Hasegawa (Kyushu Institute of Technology, Japan)*
JP15	Condition Monitoring of an LCL Filter Used in a Grid-Tied PWM Inverter Based of Analysis of its Gain Characteristic *Riku Oie and Kazunori Hasegawa (Kyushu Institute of Technology, Japan)*
KP10	Measuring Real-Time Battery AC Impedance Using a DC-DC Converter With Time and Frequency Hybrid Analysis *SeongJong Kim, Wan Kim and Hwa-Pyeong Park (Kumoh National Institute of Technology, Korea)*
KP11	Analysis of DC-link Capacitor Current in CHB Inverters Based on Modulation Strategies *Minsol Kim, Hyeongjun Park and Youngjong Ko (Pukyong National University, Korea)*
KP12	Optimal Design Method of Powder Core-Based Inductors for DC/DC Converters *Heesu Shin and Suyong Chae (Pohang University of Science and Technology, Korea)*
TP12	Development of LLC Series-Resonant Converter Based on Integrated Transformer *Yun-Yen Chen, Wei-Hao Chang and Huang-Jen Chiu (National Taiwan University of Science and Technology, Taiwan)*
TP13	A Novel Control Strategy Applied to Current-Fed Full-Bridge Converter *Ching-Chun Chuang (National Kaohsiung University of Science and Technology, Taiwan), jian-min wang, Sen-Tung Wu and Yong-Nong Chang (National Formosa University, Taiwan)*

TP14	A QAB-Based SST DC Charging System for Light Rail Transit Trains *Mei-Fang Wang and Tzung-Lin Lee (National Sun Yat-sen University, Taiwan)*
TP15	A Voltage-Following Strategy for Programmable Electronic Loads with Shared DC Bus *Chia-Chou Chang, Ho TzuHsuan, Ming-Yuan Xie and Yaow-Ming Chen (National Taiwan University)*
JP16	Common-mode voltage suppression of a passive common-noise canceller in an inverter-fed motor drive system *Jinxing Zhou and Koji Orikawa (Hokkaido University, Japan)*
JP17	Design of 4kV Single-Phase Isolated SR-SAB DC-DC Converter *Yusuke Matsubara and Takaharu Takeshita (Nagoya Institute of Technology, Japan)*
JP18	Magnetization Control Method and Verification of Inductance Increase Effect of Variable Magnet Reactors Applied to DC/DC Converters *Yuri Hayashi, Keiichiro Kondo (Waseda University, Japan), Kensuke Sasaki and Hiroshi Takahashi (Nissan, Japan)*
KP13	Design Methodology of Power Level Modulation for DC Series Arc Fault Detection and Extinguishing *Wan Kim, SeongJong Kim and Hwa-Pyeong Park (Kumoh National Institute of Technology, Korea)*
KP14	Design of 3-Level LLC Converter Voltage Controller for Wide Input Voltage Fluctuations *Hyeong-jin lee, Hag-wone Kim, KwanYhul Cho and Chanho Kim (Korea National University of Transportation, Korea)*
KP15	Modeling of Active Damping for LCL Filter in Vienna Rectifier Without Additional Sensors *JeongSeon Yu, HyeokJin Lee, Hag-wone Kim and KwanYhul Cho (Korea National University of Transportation, Korea)*

Information for Welcome Reception

Time: 18:00, November 15th Friday

Place: Seo-Seo Galbi (서서갈비) Korean traditional barbecue

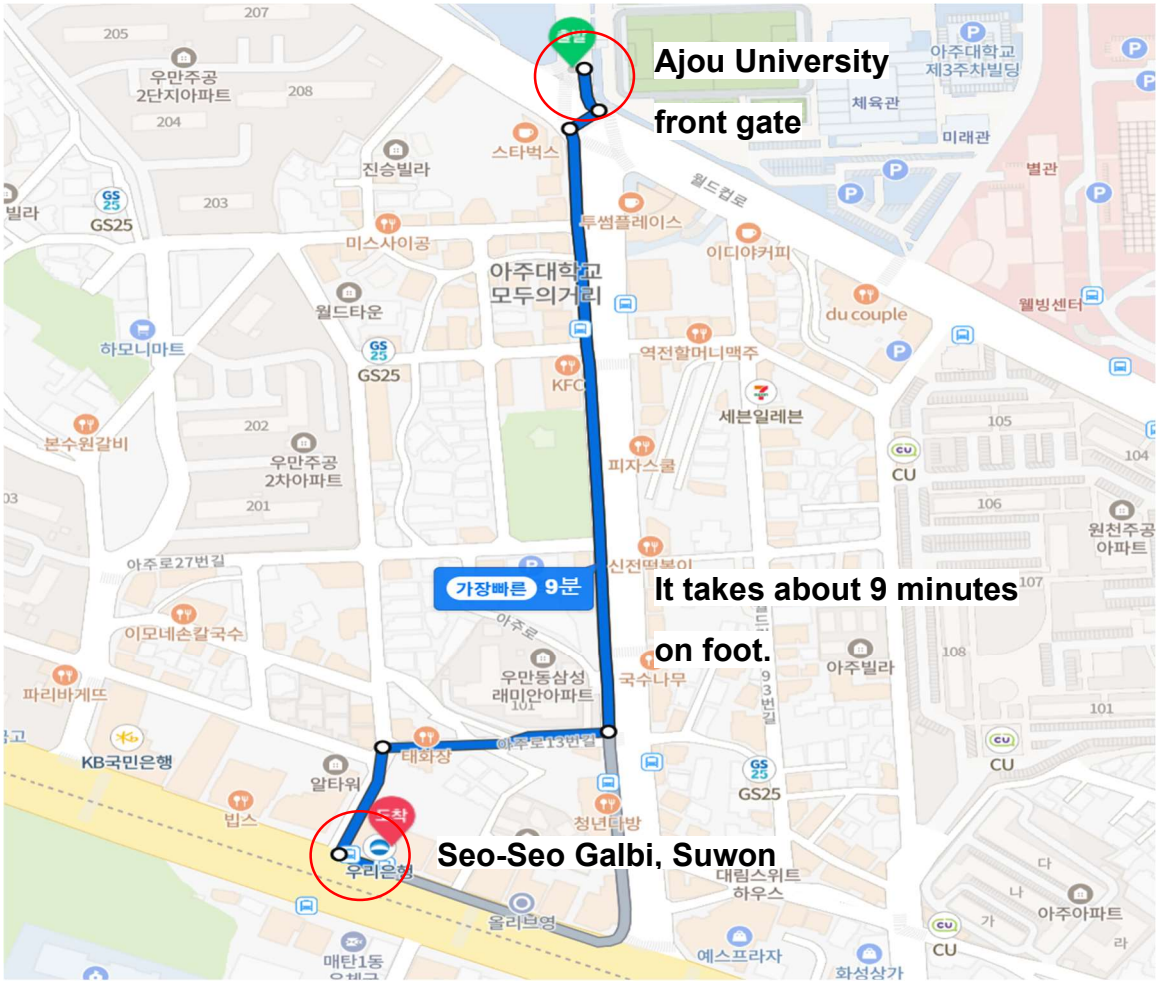
Phone: 031)217-3892

2nd Floor, 241, Jungbu-daero, Paldal-gu, Suwon-si, Gyeonggi-do

(경기 수원시 팔달구 중부대로 241 동양부페 2층)

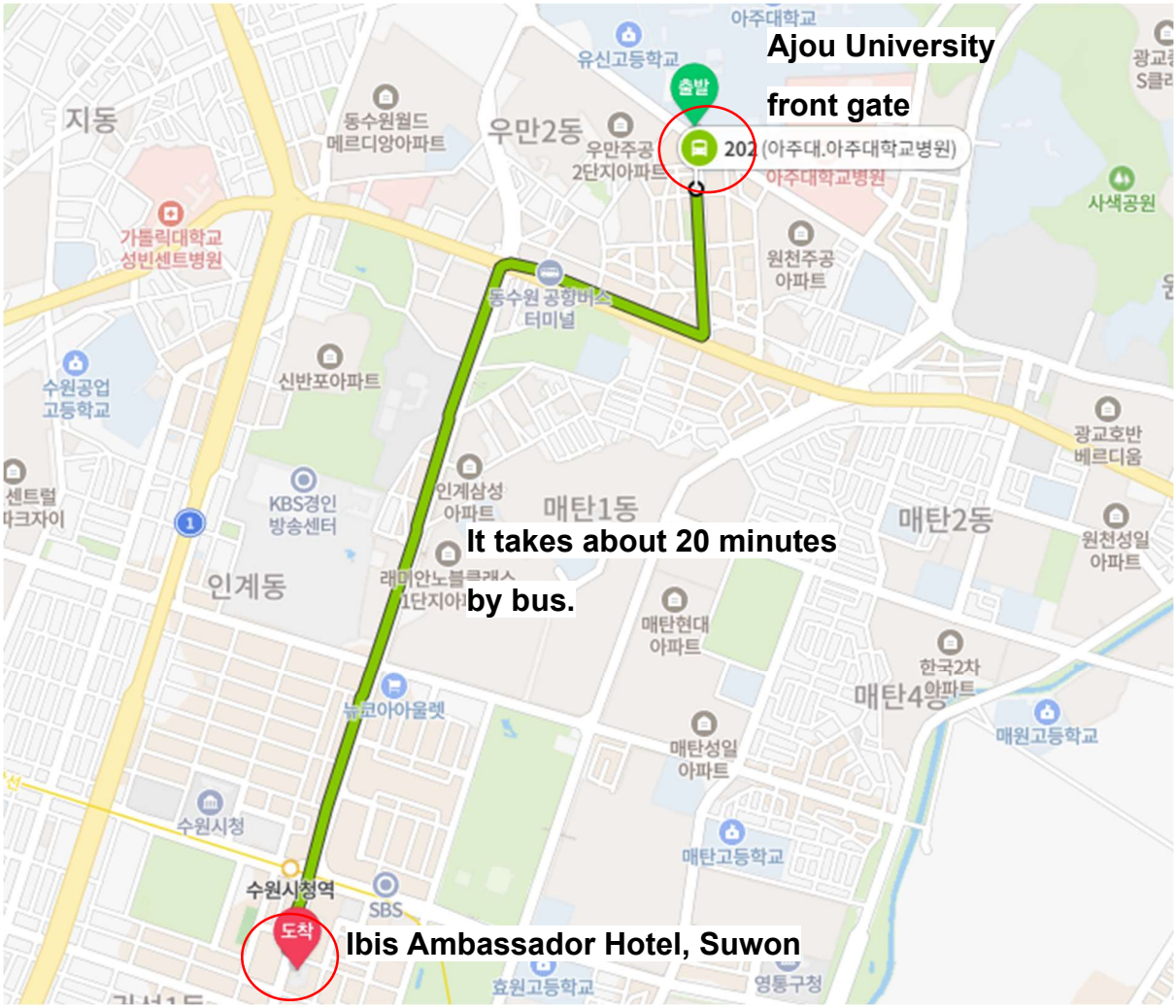
Free parking lot that can accommodate more than 200 cars

Direction from Ajou University



Information for Banquet

Time: 18:00, November 16th Saturday
Place: Ibis Ambassador Suwon Hotel, Nice hall, 6th floor



Take bus number 202 or 20-2 from the bus stop in front of KFC

Weather Information (Weather of previous years)

Weather of Suwon city during symposium weekend

- Temperature:

November 15th Friday:	4°C (Low) / 9°C (High)
November 16th Saturday:	0°C (Low) / 10°C (High)
November 17th Sunday:	0°C (Low) / 7°C (High)