CDIO Academy 2018

Pre-Assignments Guidance (May 1, 2018)

Congratulations on being selected to participate in the CDIO Academy, from June 28 – July 1st, 2018 at Kanazawa Institute of Technology (KIT), Japan!

The theme of the CDIO Academy 2018 is "**What kind of future will drones bring, and how will they affect our daily lives?"**

Please read these brief guidelines on how to complete each pre-assignment activity. The activities involve the process of identifying the problems of drones, investigating the existing solutions related to those problems of drone usage, and creating a concept proposal to solve the problem selected before you arrive at KIT in June, 2018. The completion of these pre-assignments is very important to make the CDIO Academy 2018 successful.

The ultimate goal of the CDIO Academy for each team is to design *an object-carrying drone* that can be used in the future. Drones are expected to be useful for many services, such as photography, video recording, monitoring, inspection of infrastructure, pesticide spraying, and delivery. However, the rapid development of drones causes some concerns about accidents and privacy issues.

Since only two days are given for your team work during the CDIO Academy, your team is required to design, make, and operate a drone with existing resources (time allowance and tools). The pre-assignments require you to both work individually and as a team to COMPLETE the following tasks BEFORE you arrive at KIT.

Below are some notes for EVIDENCE part regarding submission of your work:

- **M** means that you **MUST** submit the evidence of your work. Please see "Pre-Assignment-2018.pdf" for more details.
- **R** means that it is **RECOMMENDED** to share the evidence of your work on the 3DEXPERIENCE platform.
- **O** means that it is **OPTIONAL** to share the evidence of your work on the 3DEXPERIENCE platform.

	PRE-ASSIGNMENT	WHAT	HOW (INDIVIDUAL & TEAM)	C-D-I-O	TOOL	EVIDENCE	DUE
0	**PERSONALITY TEST** • PERMA Profiler	This test measures your sense of well-being and provides you with a profile of your personality.	▪ Individual*: Answer the survey questions online (you will be provided a link later). Based on your answers, you will be given a personality profile. Use the profile to answer questions about what role you will be good at on a team.* ▪ Teamwork*: There is no team element to this task.*			▪Printed copy of your personality test results ▪**Interpretation of your psychological test (M)**	May 14

	PRE-ASSIGNMENT	WHAT	HOW (INDIVIDUAL & TEAM)	C-D-I-O	TOOL	EVIDENCE	DUE
1	**INTRODUCTION** • Usage of drones • Laws related to drones (your own country) • Technical difficulties of delivery by using drones	Investigate all issues or problems related to drones regarding the laws, purposes of using drones, and general technical problems in operation.	▪ Individual *(brainstorming): Search for any problems related to the use of drones in your own country or in the world. What are the problems (usage problems, technical problems, design problems, etc.)?* ▪ Teamwork *(sharing): Share your findings with your team members.*	**C**		▪ **List of problems with short descriptions (M)**	May 14
2	**TECHNOLOGICAL** • Investigation of technical issues of drones • Mechanism of picking the object	Identify some solvable technical problems of the drones.	▪ Individual *(proposing): Propose and explain an energy-saving mechanism for pinching an object.* ▪ Individual *(proposing): Select some noticeable/ practical problems about technologies used in drones. Each team member should select 3 solvable problems.* ▪ Teamwork *(sharing): Share your findings with your team members.*	**C**		▪ **Proposal and explanation of pinching mechanism plans (M)** ▪ Results of selection: 3 problems per member (**R**)	May 21
3	**EVALUATION & SELECTION** • Evaluation of solvable problems • Selection of most solvable problem	Evaluate and select the most solvable problem of the drones to tackle with your team.	▪ Teamwork *(evaluating & selecting):* *- Discuss and create criteria to evaluate the problems of all team members'.* *- Use points for each criterion and refer to each problem. The 'problem' that receives the most points will be selected for the team.* *- Think about many aspects of the problem regarding the drone usage while evaluating the multiple problems.*	**C**		▪ The most solvable problem selected (**O**)	June 4

	PRE-ASSIGNMENT	WHAT	HOW (INDIVIDUAL & TEAM)	C-D-I-O	TOOL	EVIDENCE	DUE
4	**INVESTIGATION OF EXISTING SOLUTIONS** • Investigation of existing solutions regarding to problems related to drones • Findings of strong/weak points of current solutions	Investigate the existing solutions of the drones being used by specifying their strong points and weak points, and determine what needs to be done to improve those weaknesses.	▪ Individual: *- Investigate at least 3 existing solutions related to your selected drone problem.* *- Evaluate their strengths/ weaknesses and find out why the problem still needs to be further improved.* ▪ Teamwork *(sharing): Share your findings with your team.*	**C**		▪ Findings of existing solutions with strengths and weaknesses (**R**)	June 4
5	**ETHICAL/ SPECIFICATIONS** • Scenario of using desired drones • Influence of drones on people's lives • Setting specifications for design	Determine the scenario where your future drone can be used and the required specifications of the drone.	▪ Individual: Choose concrete examples of specific changes to society or our lives due to the development of drones and consider the social impact of those changes. ▪ Teamwork: *- Determine the scenario for using the desired drone in the future: Where, mechanism, influence on people's lives, etc.* *- What are the required specifications (constraints/ preconditions –desired conditions) that your team's desired drone would satisfy?*	**C**		▪ **Description of how drones [will] make changes to society and lives (M)** ▪ Scenario determined (**O**) ▪ Set specifications (**O**)	June 11 (Individual)
6	**IDEATION** • Creation of possible ideas for solving the problem	Create all possible ideas to solve the selected problem.	▪ Individual: *Brainstorm all possible ideas to solve the problem selected for the desired drone to be used in your desired scenario.* ▪ Teamwork: *Share ideas & group ideas into different categories of possible solutions.*	**C**	3DEXPERIENCE with CAD	▪ Results of team ideas (**O**)	June 25

	PRE-ASSIGNMENT	WHAT	HOW (INDIVIDUAL & TEAM)	C-D-I-O	TOOL	EVIDENCE	DUE
7	**CONCEPT PROPOSAL** • Proposal of concept to solve the problem selected • Specifications, functions, features of the concept	Suggest a concept proposal to solve that problem *(name, technical features [how this can solve the selected problem of the drone], functions/ operation mechanism, strengths & weaknesses, etc.).*	▪ Individual: *- Propose individual preferred concept (Tentative) using the ideas from step 6 above.* *- Be mindful to consider all technical functions of the desired drone to satisfy the problem requirements.* ▪ Teamwork: *Share the individual concepts.*	**D**	3DEXPERIENCE with CAD	▪ Individual concepts proposed (**R**)	June 25
		Illustrate the (*Tentative*) concept.	▪ Individual: *Propose the individual drawing of the individual preferred concept.*	**D**	3DEXPERIENCE with CAD	▪ Images or drawings of individual concepts (**R**)	June 25
		Final concept proposal.	▪ Teamwork: *- Share the individual concepts (+ illustration).* *- If possible, evaluate and select the best one using the same method in Step 3 above.* ** This activity can also be done upon arrival at KIT.*	**D**	3DEXPERIENCE with CAD	▪ Final concept proposal and its drawing (**R**)	
		If a team can propose a final concept before coming to KIT, you will have more time to build and test your prototype at KIT. **If a team cannot reach a final agreed concept proposal before coming to KIT, please bring the individual concept proposals to KIT for direct discussion and selection. However, this case may take more time.**					

	TASK	WHAT	HOW (INDIVIDUAL & TEAM)	C-D-I-O	TOOL	EVIDENCE	DUE
8	**MAKE THE DRONE (RIG TESTBED)**	Construction of concept proposal	▪ Teamwork: At Kanazawa Institute of Technology	**I**	3DEXPERIENCE with CAD	Drones designed and made	June 28 -July 1, 2018
9	**TEST THE DRONE (RIG TESTBED)**	Test and demonstrate the rig testbed	▪ Teamwork: At Kanazawa Institute of Technology	**I**		Demonstration using the rig testbed	June 28 -July 1, 2018
9	**OPERATE THE DRONE**	Demonstrate the designed drone	▪ Teamwork: At Kanazawa Institute of Technology	**O**		Videos of flight and transportation demonstration (Drone is operated by KIT staff)	July 1, 2018

Should you have any inquiries, please do not hesitate to contact us at cdioac@mlist.kanazawa-it.ac.jp