

COMPUTER

1. PURPOSE OF THE COURSE

Refer to each sub-course.

2. TRAINING PROGRAM

(1) General Orientation and Japanese Language Program

The General Orientation and Japanese Program are organized at the Chubu International Centre of JICA prior to the technical training, to assist participants in understanding Japan and adjusting themselves to life in Japan, and thus to facilitate effective training.

(2) Technical Training

Refer to each sub-course. (Total: five sub-courses)

3. NUMBER OF PARTICIPANTS TO BE ENROLLED

8 persons (See each sub-course for details. If each sub-course is filled, some sub-courses may accept second candidates.)

Candidate should be qualified.

4. TRAINING DURATION

From March 10 to October 23, 2015

(1) Arrival in Japan

March 9, 2015

(2) Briefing

March 10, 2015

(3) General Orientation

From March 11 to 13, 2015

(4) Japanese Language Program

From March 16 to May 6, 2015

(5) Technical Training

From May 8 to October 22, 2015

(6) Closing Ceremony

October 23, 2015

(7) Departure from Japan

October 28, 2015

5. TRAINING INSTITUTION

(1) General Orientation / Japanese Language Program

Chubu International Centre (JICA CHUBU), JICA

4-60-7, Hiraike-cho, Nakamura-ku, Nagoya, 453-0872, Japan

Tel: +81(*)-52(**)-533-0220 Fax: +81(*)-52(**)-564-3751

URL: <http://www.jica.go.jp/branch/cbic/index.html>

(2) Technical Training

Hokuriku Branch Office, JICA

Rifare Bldg (Office Tower) 4F, 1-5-2, Honmachi, Kanazawa-shi, Ishikawa-ken, 920-0853, Japan

Tel: +81(*)-76(**)-233-5931 Fax: +81(*)-76(**)-233-5959

(*) country code of Japan (**) area code

6. CONDITIONS OF APPLICATION

(1) Applicants should have graduate degree in a certain scientific or engineering educational course of a university or an institute of technology, showing the certified list of subject items with the marks obtained in each subject.

(2) Applicants should have an adequate ability in English conversation to be able to perform satisfactorily in the course. (TOEFL score: more than 490)

(3) Applicants should be good in health, both physically and mentally, to undergo the training; pregnancy is regarded as a disqualifying condition for participation in the training.

(4) Applicants should not be presently serving in the military.

7. APPLICANTS MUST SUBMIT ANNEX WITH THE APPLICATION DOCUMENTS

(1) Applicants should submit the certified list of subject items with the marks obtained in each subject issued by a university or an institute of technology.

(2) Applicants should decide their order of preference 1st ~6th from the following six sub-courses. Once an applicant decides, he/she should write the order of preference in Annex sheet. This will be used only as a reference for the screening committee.

Note: Applicants should be capable enough to pursue any of the sub-courses in order for the training institute to have a wider range of decision on screening. This is why any lack of preferences may result in an unsatisfactory application.

(3) Applicants are required to answer the questions on Annex sheet.

Sub-Course Title: ①IoT (Internet of Things)

(The number of acceptable participant : Maximun2}

Technology field: IoT(Internet of Things), Computer Vision , Robot Technology, Embedded Technology

Purpose of the Course:

The objective of the training course is to provide the latest available computer techniques for IoT using Computer Vision, Robot Technology and Embedded Software Technology . In this course, In this course, the participant design basic and implement the software technology about above technology fields.

Course Description:**(1) Basic Training**

- Computer Vision: Image formation, Processing, Feature detection and matching, Segmentation
- Robot Technology: Basic Concept, Classification and Structure, Manipulator, Drive and Control
- IoT: MANET(Mobile ad-hoc Network), Data Mining Technology, Cloud Computing

(2) Independent Study under a specific research project theme:

- Computer Vision:
 - Detection of abnormal running vehicle in high-way using high-speed camera
 - Judgment of state of RNA and protein in nucleocytoplasmic transport
 - Detection of vehicle using deformable model and Support Vector Model
- Robot Technology:
 - Robot Hand using EEG
 - SLAM(Simultaneous Localization and Mapping) System using ICP Algorithm.
 - AGV(Auto Guided Vehicle) under severe environments
- IoT(Internet of Things)
 - Environment monitoring system using sensor network
 - Implementation of cloud sensor network system using 3G and ZigBee
 - Smart Grid System
 - High Reliability Data Replication System on Mobile ad-hoc Network.

Hardware and software environment

Hardware: Personal Computer (Intel Core i 7), Robots (Robovie, Palro, iRobot and some original robots), High Vision Camera Unit, Mote sensor, Wireless Location sensor (Ekahau), Kinect, Laser Range Scanner. Arduino, Raspberry Pi, Beagle Board, Leap Motion, Zigbee(XBEE), Sensor, etc

Computer Software: Microsoft (Developer Network Academic Alliance, Office Enterprise), Adobe (Creative Suite, Flex Builder), Matlab/Simulink, OpenCV, Python (many packaged software)

Sub-Course Title: ②Visual Interactive Education System using Modern Information Technologies

(The number of acceptable participant : Maximum 2)

Purpose of the Course:

The goal of this training course is to realize a visual interactive education system using modern information technologies like computer vision, image processing, computer graphics, 3D stereoscopy, web and mobile computing. The objective of the training course is to provide the latest available computer techniques for visual interactive education system using modern information technologies. In this course, the participant designs and implements a visual interactive education system using modern information technologies. It is preferable that the participant has some experiences of programming and fundamental knowledge of above-mentioned technologies.

Course Description:

(1) Learn Basics

Review of the subject that can be learn with the system

Examples

- Computer vision and image processing (using OpenCV, Processing)
- Computer graphics (using OpenGL, Processing), etc.

Study for the fundamental technology to build the system

(2) Design and implement of a visual interactive education system

Learning model design

Human interaction model design using modern information technologies

Examples

- Color analysis of images input by camera or scanner using computer vision and image processing
- Color design using computer graphics, etc.

Examples of system

- Visual interactive programming education system using computer graphics and color design
- Visual interactive color design education system using image processing and computer graphics
- Location-based outdoor education system using GPS mobile devices
- WebGL contents for chemistry/biology learners
(e.g. virtual specimens of some molecules and creatures)
- Kinect application for early education
- Any other study topics similar to the above are also available.

(3) Evaluations

Learning effect inspection by pre and post test analysis

Usability investigation by questionnaires for learners

Availability and project productivity check

Hardware and software environment

Hardware: Hardware: PCs with Intel Core i7 CPUs and GPUs, HD Webcam, HD digital video camera, Microsoft Kinect and Android terminal

OS: Windows 7,8 Professional, Android

Development Environment: Microsoft Visual Studio, Eclipse, Processing IDE and MAYA

Computer Languages: C, C++, Processing, PHP, Java, Javascript, HTML5 and WebGL

Software Libraries: OpenCV, OpenGL, and Processing various libraries

Sub-course Title: ③Information Analysis of Web Contents in Social Media

(The number of acceptable participant : 1)

Purpose of the Course:

The purpose of this course is to develop statistical methods to analyze and to explore a huge amount of messages in social media.

The participant is expected to have experiences on the Web programming and statistical data analysis, and, ideally, pattern recognition and natural language processing with open source frameworks.

Programming and data analysis skills will be also developed through the course.

Course Description:

Course Description:

(1) Learn Basics

- Statistical Data Analysis with R
- Natural Language Processing
- Pattern Recognition,
- Web programming
- OpenGL programming

(2) Independent Study under a specific research project theme:

Some suggested themes:

- Development of internet navigation system using Web programming.
- Development of internet DB system for social media data, using Apache, Python and/or Java, and MySQL.

Additional theme may be possible, depending on the needs and skills of the student through discussions.

(3) Hardware and Software environments

OS: Linux, Windows 7, Mac OS

Software: Necessary software systems are available if needed.

Open source: Fedora Core, Apache, Python, Java, MySQL for social media DB

Sub-course Title: ④Embedded Computer Systems Design

(The number of acceptable participant : 1)

Technology field: Computer science and engineering

Purpose of the Course:

The participants are expected to learn design methodologies for embedded computer systems including processor and interface modules to be implemented into FPGAs (field programmable gate arrays) by using a graphical design tool called Visual Elite.

Course Description:

Suggested projects include the following steps:

(1) Basic training:

- Design of functional circuit module by using logic-gate symbols, truth tables, state-transition charts, and flow charts.
- Implementation of the functional circuit modules into FPGAs.
- Assembler-level programming using an original 16-bit processor module and its emulator system.

(2) Development of advanced processor modules providing some accelerator circuits such as decimal adder, floating-point adder, and/or parallel pipeline sorting unit, including designs for processor architecture and instruction set.

(3) Development of practical embedded computer systems using the advanced processor modules described above usable for such as robot controlling, computer network switching, or special purpose accelerating general computer systems.

Hardware Environment:

Windows-7 workstation and Note book

Software tools:

Visual Elite and related tools (graphical logic systems design tools by English).

Required knowledge:

Basic theory for gate-level logic circuit designs.

Basic software programming for describing flow charts.

Sub-Course Title: ⑤ Visualization Techniques in Computer Graphics

(The number of acceptable participant : 1)

Technology Field: Computer Graphics, Geographic Information System, Remote Sensing, and Web programming.

Purpose of the course:

The objective of the training course is to provide the latest available computer techniques for visualizing our natural and man-made environments. The techniques for building 3D graphics contents in the internet site are learned by this project study. Some examples are as follows:

- Application of geo-visualization techniques for presenting and exploring structures and processes from geospatial data;
- real-time visualization techniques, including modeling of buildings and trees in 3D urban city, texturing for rendering such models;

Course Description:

(1) Learn Basics

- Remote sensing and Geographic Information System (GIS)
- OpenGL or Mesa 3D programming
- Knowledge of AutoCad, AutoCad Civil 3D, AutoCad Map 3D

(2) Independent Study under a specific research project theme:

Some suggested themes:

- Development of an application program for modeling and rendering of 3D city, using AutoCad Civil 3D 2013.
- Development of visualizing 3D Earth environment, based on the remote sensing data and GIS.
- Building 3D graphics scenes and animations using Maya 2013 or 3Ds Max 2013.
- Making of 3D Graphics animation movies using Maya or 3Ds Max.
- Development of navigation system using GPS and GIS data.
- Development of internet DB system for GIS and remote sensing images, using apache, PHP (or JSP), and MySQL.
- Analyzing the remotely sensed satellite image data.

Additional theme may be possible, depending on the needs and skills of the student through discussions.

(3) Hardware and Software environments

OS: Linux, Windows 7, OSX

Softwares: Maya 2012, 3Ds Max 2012 for 3D graphics,

IDL 6.3 and Matlab for visualization,

AutoCad Civil 3D 2013 for 3D City Modeling,

Authoring tools: Adobe Premiere Pro, After Effects, Audition, Photoshop, Illustrator,

Open source: Fedora Core, Apache, PHP, Grass for GIS, MySQL for Remote Sensing image DB

Exclusive use of a workstation computer with a strong graphic card such as NVIDIA Quadro 2000 for the project study

Sub-Course Title: ⑥ Complex systems and Unconventional Computation

(The number of acceptable participant : Maximun 1}

Purpose of the Course:

The aim of this course is to apply the complex systems approach to software development. In this course, the participant is expected to have fundamental skill about the computer programming.

Course Description:

(1) Large-scale Neural Networks using CUDA

It is expected that neural networks with large number of neurons has outstanding capability for many kind of tasks. However the simulation of neural networks with large number of neurons needs a vast computing power. In this project we use CUDA, GP-GPU based parallel computing environment, to simulate the neural network with large number of neurons.

(2) Computer Games using Cellular Automata

It is known that some kinds of cellular automata can emulate video game on their array. In this project we search cellular automaton rules in which video game can be performed and develop software to simulate the cellular automata.

(3) Functional Programming

Combinatory calculi are fundamentals of functional programming languages. In this project we develop the simulator of combinatory calculi.

(4) Robot Control Programming with Neural networks

In this project we develop a recurrent neural network program to control small robot.

Hardware and software environment

Hardware: Personal Computer (Windows, Linux), Robots (Khepera, e-puck, K-junior(in preparation)).

Computer Software: Microsoft (Developer Network Academic Alliance, Office Enterprise) , etc

ANNEX

Japan –Mexico Exchange Program 2014

Full Name	
Where to contact	Tel. Fax. Email.
TOEFL Score	

Please refer to the course information and write your order of first to sixth preference below.

Sub-course title	Your order
IOT (Internet of Things)	
Visual Interactive Education System using Computer Vision and Graphics	
Information Analysis of Web Contents in Social Media	
Embedded Computer Systems Design	
Visualization Techniques in Computer Graphics	
Complex systems and Unconventional Computation	

Describe the subject of your interest and explain what kind of skill you want to acquire through this course.

Write your work experience

To participate in this course,

☐ I quit my job ☐ I keep my position at work ☐ Others ()

Explain how you would like to use your training experience on your return.

Introduce yourself

You must attach the certified list of subject items with the marks obtained in each subject issued by the university or institute of technology that you graduated from. And please check the documents

with the below check list before submitting the documents.

Check List

- ☐ Application form: Did you fill the all blank? Were there no doubts on your remarks in the document?
- ☐ Annex: Did you fill out the all blank?
- ☐ Attachment: Did you attached your certified list of subject items?

Caution: If there is any mistaken in the documents, the applicant will not be accepted in this course.