# Work Item: Universal Acceptance (UA) Curricula for Academic Programs

Ver.: 2022-12-08

## Purpose

Today, the building blocks of the domain name and email systems do not find enough space in educational materials. This work aims to address this gap with the focus on basics of internationalization and Universal Acceptance (UA), with focus on Internationalized Domain Names (IDNs), and Email Address Internationalization (EAI). The objective of this work is to  create UA related curricular outlines and materials for basic internationalization and specifically  IDNs and EAI. This will be developed for eventual integration into the IT-related curricula for technology programs for a long-term sustainable change for supporting UA.

- UA Working Group proposing the work item: UA Measurement WG
- Reference to the Action plan: FY23
- Reference to work item(s): M5

Targeted audience for the educational materials:
- Technical Trainers
- CS/IT Program Faculty Members / Lecturers
- University/ College students
- Programmers

Sample list of programs under which UA could be covered:
- Electrical and Computer Engineering
- Computer Science(CS) and Informatics
- Computer Networks
- Software Engineering
- Information Systems, Information Technologies
- Mathematical Engineering
- Information and Communication Technology

## Description of Work

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1. Materials developed should cover all stages of UA Readiness, including accept, validate, process, store and display in all software applications. For email, it should cover sending, receiving and creating internationalized email addresses.
2. Develop separate outlines of course modules to be covered by the different IT courses taught at the university, e.g. programming courses, networking courses, etc. The modules should include at least the following:
    a. Impact of supporting all domain names and email addresses, including internationalized domain names and internationalized email addresses.
    b. Introduction to internationalization with the Unicode standard and its input, processing and output methods.
        i. Introduce input methods (e.g. Keyboard) and fonts (and font support).
        ii. Normalization
        iii. Regular expressions and their limitations
        iv. UTF formats
        v. Recognizing script of a label (and identify mixed-script labels)
        vi. Label length
        vii. Internationalization and localizations

    c. Introduction to domain names and internationalized domain names.
        i. Introduction to the Internet's domain name system
        ii. IDNs and IDNA2008 standard
        iii. U-label vs. A-label formats and conversion algorithm.
        iv. Differentiating between IDNA2008 and earlier IDNA2003 versions.
        v. Pre-processing an IDN domain name.
        vi. Validating, processing and storing internationalized domain names (both as U-labels and A-labels) and internationalized email addresses in UTF8 format.
        vii. Checking same-script and mixed-script domain names.
        viii. Resolving internationalized domain names and internationalized email addresses.
    d. Components of DNS and email servers and their configuration to support internationalized domain names and email addresses.
        i. Using DNS tools for IDNs and EAI and other sysadmin aspects.
        ii. Configuring the resource records in the zone files (e.g. MX records, others)
        iii. Configuring the mail servers to support EAI, e.g., to support SMTPUTF8 flag.
    e. Implementing guidelines for UTF8 mailbox names and aliases.
3. It is anticipated that a total of 30 hours of course material (distributed into different modules) will be able to cover these topics.
4. Identify the courses in which each of the modules should be integrated in the core Computer Science and IT undergraduate curricula, e.g.:
    a. HTML and front-end programming
    b. Back-end programming
    c. Mobile programming
    d. Unicode Programming
    e. Data Science
    f. Databases

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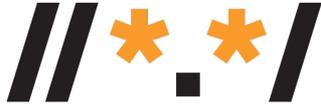
      g.    Networking

      h.    Cyber Security, Computer Security

      i.    Operating systems

5. Develop detailed course materials for each module based on the target courses in which these are to be integrated.  The materials should include the following:

    a.    Explanatory materials in text and pptx format.

    b.    Sample codes (two popular programming frameworks (Python and Java)  for computers and two popular programming frameworks for mobiles on Android and IOS).  Students would need to know the relevant programming languages to understand this code.

    c.    Video recording of presentation integrating the materials above for faculty and students.

    d.    Based on estimated classroom lecture time for the different modules, division of material in a series of 50 minute lectures.

    e.    Recommendations and samples for assignments and testing students.

    f.    The training material should identify items which could be localized.

    g.    In addition, localized examples of domain names and email addresses should include the following scripts: Arabic, Chinese, Sinhala, Tamil, Devanagari, Thai, Latin, Cyrllic, Ethiopic and Hangul.

The content will be in academic writing format to educate the students of technical programs at universities/colleges. The expected outcome of this work is that faculty members include Universal Acceptance, Internationalized Domain Names (IDNs), and Email Address Internationalizations (EAI) as part of their curriculum and teach these topics using the developed educational material regularly to their students.

6. The contractor will work with a linguistically diverse panel, suggested by UASG, consisting of academicians (university professors teaching relevant subjects) and software developers from different regions. The work will be done in an international way that can be easily localized for different regions with translation.  This will include regular meetings between the contractor and the panel (including an initial set of requirements analysis).

7. Develop a list of references (books, online articles, etc.) as supporting material. Get input from UASG members.

## Deliverables

Based on the work summarized above, the contractor will provide the following deliverables:

1. Draft list of modules, detailed course outline of each module, and explanation on which courses these modules should be integrated in and how; for review by the community.

2. Final list of modules, module outline and list of courses (in which to integrate each module) based on community input.

3. Detailed set of materials (including tutorials) for each module, including explanatory text, corresponding pptx slides, sample quiz, exam questions (and answers), and references for community feedback. The materials should cover the topics outlined in the description above as well as these should include localized examples as per the description.

4. Pilot run of the courses with university students and faculty in a workshop to get additional feedback.
5. Final set of module outlines and materials, with details on how to integrate these in existing coursework.
6. Video recording of presentations for each module.

## Timeline
- Tentative start date: Date of signing of the contract.
- Tentative end date: Up to six months of the contract start date.

## Conflict of Interest

To help avoid any perceived or actual conflict of interest (COI), UASG leaders, UASG Ambassadors, members holding working group's leadership positions in the UASG, and any organization(s) affiliated with individuals in these UASG roles, are prohibited from participating in this SOW. In addition, ICANN org COI applies.

## Proposal Submission

The proposal should include the expertise with academic writing and technical knowledge and experience in Universal Acceptance. A short list of previous academic publications should be included in the proposal. The proposal should be submitted to: UAProgram@icann.org before the submission due date.

## References
https://unicodebook.readthedocs.io/
Computer Science Internationalization - Internationalization Workshop
https://schappo.blogspot.com/2018/01/computer-science-internationalization_17.html

⊖ https://speakerdeck.com/andre_schappo/unicode-regular-expressions
⊖ https://jsfiddle.net/user/coas/fiddles

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