**Application for ISCB Degree Program Endorsement**

To apply for degree program assessment, please fill out the blue boxes in the attached form. You can expand the boxes as needed to put in the required information. Supporting information may further be provided by hyperlinks or through any additional documentation you wish to provide. Additional guidance is provided in the document.

**1. Basic Program Information**

**Program name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Principle applicant(s) (e.g., Program Director):** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Institution:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Address:**

**Degree name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Program website URL:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Site(s) at which the program is offered:**

**Language(s) in which the program is offered:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Certification authority, if any (e.g., national or regional accreditation authority by which the program is approved):**

**Years in operation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Cohorts graduated:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Total alumni:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Total students currently enrolled:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Minimum hours of study per student:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2. Program Description**

Program Summary (a brief description of the program):

**Program training faculty with titles and roles:**

**Link to program requirements and curriculum (or paste details below)**:

**Means of assessment:**

**Policies and practices for insuring equity and inclusivity:**

**Signing authority (e.g., who can legally sign that the form represents the program or institution):**

**Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

We ask applicants to help us evaluate a program through mapping learning objectives and educational experiences through a competency framework. We will be working with the ISCB v3 competency framework. Those unfamiliar with competencies might refer to past publications on the ISCB competency framework:

<https://zenodo.org/records/10466596>

<https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1003496>

<https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1004943>

<https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1005772>

We reproduce the competencies below:

|  |
| --- |
| **ISCB v3 Competencies** |
| A3: Work at depth in at least one technical area aligned with the life sciences |
| B3: Prepare life science data for computational analysis |
| C3: Have a positive impact on scientific discovery through bioinformatics |
| D3: Use data science methods suitable for the size and complexity of the data |
| E3: Manage own and others’ data according to community standards and principles |
| F3: Make appropriate use of bioinformatics tools and resources |
| G3: Contribute effectively to the design and development of user-centric bioinformatics tools and resources |
| H3: Make appropriate and efficient use of scripting and programming languages |
| I3: Construct, manage and maintain bioinformatics computing infrastructure of varying complexity |
| J3: Comply with professional, ethical, legal and social standards and codes of conduct relevant to computational biology |
| K3: Communicate meaningfully with a range of audiences - within and beyond your profession |
| L3: Work effectively in teams to accomplish a common goal |
| M3: Engage in continuing professional development in bioinformatics |

Table 1. The ISCB v3 competencies. For more detail and specific Knowledge, Skills, and Attitudes (KSAs) associated with the competencies, see <https://competency.ebi.ac.uk/framework/iscb/3.0/competencies>. For purposes of this worksheet, we will refer to the competencies by their letter codes (A-M).

In applying the evaluation framework, we use Bloom’s revised taxonomy to reflect the level at which a competency is mastered. These levels in order of increasing mastery are:

**1. remember**

**2. understand**

**3. apply**

**4. analyze**

**5. evaluate**

**6. create**

For more information, see, for example, <https://www.valamis.com/hub/blooms-taxonomy>. For purposes of this worksheet, we will abbreviate the levels of mastery by their numbers (1-6).

**3. Prerequisites**

While there is more to a program evaluation than just competencies, we will focus here on how they can be used to assess the alignment between a program’s learning objectives, its educational experiences (typically courses for our purposes), and the personas of students it is meant to serve. Before we get there, though, we need some idea of who the program is serving and what training they can be expected to have when they are admitted.

Describe the expected profile of an incoming student, particularly the prior training assumed of the program and any options for remediation of students not fitting the profile:

**Profile of incoming student, including perquisite knowledge and remediation mechanisms:**

We use the Bloom’s framework to summarize the prerequisite expectations of the program, including assumed prior training after any individualized remediation. For each competency, please summarize this by assigning a level of mastery assumed as prerequisite knowledge of the program, or leave it blank if incoming students are not expected to exhibit any mastery of that competency:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F | G | H | I | J | K | L | M |
| PREREQS |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 2. Prerequisite knowledge of the program. The table should identify any competencies, along with their level of mastery per Bloom’s hierarchy that will be enforced by program admissions or remedied with remedial education before they get to the program’s main educational experiences.**

**4. Learning Objectives**

Next, please list the learning objectives, i.e., expected educational outcomes, of the program:

**Learning Objectives (list below, adding or removing lines as needed)**

O1.

O2.

O3.

O4.

O5.

To help us evaluate the program, please map them to competencies. We again use the Bloom’s framework for this, assigning to each objective and competency a level of mastery at which a student must master the competency to meet the objective, if any. You can use the table below to keep track of this mapping. For each cell, provide a Bloom number for the given competency and objective, or leave it blank if the objective does not require any mastery of that competency. In the final row, provide the maximum level of mastery needed for each competency across all objectives. You may need to add or remove rows to match the given number of learning objectives.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F | G | H | I | J | K | L | M |
| O1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| O2 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| O3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| O4 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| O5 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MAX |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 3. Mapping of learning objectives to competencies for the degree program under evaluation.**

**5. Educational Experiences**

We next need to evaluate the educational experiences. For a degree program, these might be considered at the granularity of specific courses of training. For a short course, these might be a finer level of detail of specific training modules or exercises.

**Educational Experiences (list below, adding or removing lines as needed)**

E1.

E2.

E3.

E4.

E5.

Just like with learning objectives, we wish to map the educational experiences to competencies using the Bloom’s framework. Pleasessign to each objective and competency a level of mastery at which a student must master the competency to meet the objective, if any. You can use the table below to keep track of this mapping. For each cell, provide a Bloom number for the given competency and experience, or leave it blank if the objective does not require any mastery of that competency. In the final row, provide the maximum level of mastery needed for each competency across all experiences. Add or remove rows as needed.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F | G | H | I | J | K | L | M |
| E1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E2 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E4 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| E5 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MAX |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 4. Mapping of educational experiences to competencies for the degree program under evaluation.**

**6. Mapping Learning Objectives to Training Personas**

A final step in assessment is assessing whether the learning objectives align with the training needs of the program students. We assess this through career profiles. You can find a set of career profiles mapped to competencies at <https://competency.ebi.ac.uk/framework/iscb/3.0> or you might design your own. Describe here the career profiles for which the training program is expected to prepare one, essentially jobs for which a graduate of your program should be prepared:

**Career Profiles (list below, adding or removing lines as needed)**

C1.

C2.

C3.

C4.

We once again use the Bloom’s framework to keep track of expectations for these profiles. If you use a profile from the EBI Competency Mapper, then these are already filled out for you. For each cell, provide a Bloom number for the given competency and experience, or leave it blank if the objective does not require any mastery of that competency. In the final row, provide the maximum level of mastery needed for each competency across all experiences. You may add or remove rows as needed.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F | G | H | I | J | K | L | M |
| C1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C2 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C4 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| MAX |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 5. Mapping of career profiles to competencies.**

**ISCB Endorsement Evaluation Form**

The form field below is designed to provide guidance and a rubric for evaluating a program proposed for affiliation and a rubric for making the evaluation. We expect reviewers to use their professional judgement in how to apply these, but offer the rubric as a common framework for ensuring fairness and consistency in the evaluation process.

**1. Evaluation of Learning Prerequisites (see Table 2).**

Please evaluate the stated learning prerequisites. You might, for example, consider if they are realistic and appropriate for the target student population or if they might be lacking in important components needed to adequately prepare a student for the proposed program.

**Comments or revisions needed to program prerequisites:**

The mapping of prerequisites to competencies should be identified by the program, but you as an evaluator may question the assignment. Make note of any concerns or changes here.

**Revisions needed to the mapping of prerequisites to competencies:**

**Assessment of prerequisites:** \_\_

Please rate prerequisites on a scale from 0-5: (5 = Realistic for the target student population and well chosen for program goals; 4 = Largely realistic and well chosen but with some recommended minor changes; 3 = Require some significant revision to be realistic and well aligned to the target student population and program goals; 2 = Substantively incomplete or misaligned with target student population and program goals and require extensive revision; 1 = Require complete rewriting to align with target student population and program goals; 0 = Prerequisites missing or fully unresponsive to needs of program)

**2. Evaluation of Learning Objectives (see Table 3).**

Please evaluate the quality of the learning objectives. You might consider, for example, if the objectives, are well defined, achievable, sufficiently comprehensive, and not excessive for the scope and goals of the program.

**Comments or revisions needed to the learning objectives:**

**Revisions needed to the mapping of learning objectives to competencies:**

**Assessment of learning objectives:** \_\_

Please rate learning objectives on a scale from 0-5: (5 = Objectives are well defined, achievable, and aligned with program goals; 4 = Some recommended minor changes recommended; 3 = Significant revisions required; 2 = Objectives are substantively incomplete, ill defined, unachievable, or misaligned with program goals; 1 = Complete or nearly complete rewriting required; 0 = Learning objectives missing or fully unresponsive to program needs)

**3. Evaluation of Educational Experiences (see Table 4).**

Please evaluate the educational experiences. You may consider, for example, if the experiences are well tailored to the program needs, consistent with best practices pedagogically, consistent with current scientific knowledge, and of suitable scope for the length of the program, as well as whether they show any notable creativity in teaching practice.

**Comments or revisions needed to the educational experiences:**

**Revisions needed to the mapping of educational experiences and competencies:**

**Assessment of educational experiences:** \_\_

Please rate educational experiences on a scale from 0-5: (5 = Educational experiences are well aligned with program needs and current best practices of pedagogy and the field; 4 = Largely suitable but with some recommended minor changes; 3 = Require some significant revision; 2 = Substantively incomplete or misaligned with program needs; 1 = Require nearly complete rewriting to align with program needs; 0 = Learning experiences are missing or fully unresponsive to needs of program)

**4. Evaluation of Training Personas (see Table 5).**

Please evaluate here the training personas, defining career goals for which the program is meant to prepare a student. You might consider, for example, if the personas considered are well aligned with the stated goals of the program and if they are sufficiently focused as to be achievable in a coherent program while being broad enough to meet students’ likely needs. If the applicants have defined novel personas, you might further consider if they are well defined and providing a reasonable definition of the intended career path.

**Comments or revisions needed to the training personas:**

**Revisions needed to the mapping of training personas competencies:**

**Assessment of training personas:** \_\_

Please rate training personas on a scale from 0-5: (5 = Training personas are well defined and appropriate in scope and diversity for program goals; 4 = Largely appropriate but with some recommended minor changes; 3 = Require some significant revision; 2 = Substantively incomplete, ill defined, or inappropriate in scope for program needs; 1 = Require complete or near-complete rewriting to align with program goals; 0 = Missing or fully unresponsive to needs of program)

**5. Overall alignment of prerequisites, learning objectives, educational experiences, and training personas.**

We can now evaluate whether the training needs identified in the career profiles aligns with the learning objectives, educational experiences, and prerequisites program. Tables 2-5 give us a basis for assessing whether the program as designed can meet its objectives through the window of competencies. You may find it helpful to reproduce the bottom rows of the tables here:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | D | E | F | G | H | I | J | K | L | M |
| PREREQS |  |  |  |  |  |  |  |  |  |  |  |  |  |
| EXPERIENCES |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OBJECTIVES |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PERSONAS |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 6: Summary of competencies assumed by prerequisites, learning experiences, and learning objectives.**

Provide a summary here of how well the program meets its objectives and provides appropriate training for the personas. Identifying gaps, if any, and offer recommendations for how they might be addressed. If the program fails to align with its objectives, that might be addressed in various ways. For example, the program could assume additional prerequisite knowledge, add or adjust educational experiences, or narrow the scope of its learning objectives. Provide recommendations here:

**Assessment of alignment of the program to career profiles with recommendations and recommendations for improvement:**

**Assessment of overall alignment of program:** \_\_

Please rate the overall alignment of prerequisites, learning objectives, training experiences, and personas on a scale from 0-5: (5 = Strong alignment across all components; 4 = Very good but with some recommended minor changes; 3 = Good but requires significant revision in one or more components; 2 = Requires extensive revision; 1 = Requires complete rewriting; 0 = Alignment undefined or undefinable for the program as described)

**6. Additional Review Criteria**

**Suitability of the faculty, environment, and other resources**

Please assess the ability of the institution and faculty to offer the program as described. Your assessment might encompass the physical facilities of the institution, the qualifications of the program leadership and other faculty, and the track record of the program, among other factors.

**Comments or revisions needed on ability to offer the program as described:**

**Ability of the institution and faculty to offer the program as described:** \_\_

Please rate ability to offer the program on a scale from 0-5: (5 = Highly qualified to offer the program as described; 4 = Well qualified but with some recommended minor changes; 3 = Significant deficiencies in one or more components; 2 = Program appears substantively unrealistic given the documented resources; 1 = Program appears entirely unrealistic given resources; 0 = Necessary resources to offer the program missing or unavailable)

**Diversity, Equity, and Inclusion**

Please assess the mechanisms for ensuring the program is suitably inclusive, equitable, and supportive of diversity appropriate to its goals and context.

**Comments or revisions needed on program diversity, equity, and inclusion:**

**Diversity, Equity, and Inclusion:** \_\_

Please rate the program mechanisms for promoting diversity, equity, and inclusion on a scale from 0-5: (5 = Strong mechanisms without notable weakness; 4 = Very good mechanisms but with some recommended minor changes; 3 = Mechanisms require some significant revisions; 2 = Mechanisms require extensive revision; 1 = Mechanisms require complete or near-complete rewriting; 0 = Mechanisms unidentified or missing)

**7. Concluding Remarks**

Please provide here a final summary of your assessment and recommendations for the program.

**Summary of Assessment and Recommendations:**

Taking into account all of your criterion scores, please provide a recommended action for the program review. Note that this action is not intended to be a direct average or sum of your criterion scores, but your evaluation of the individual review criteria is meant to inform your recommendation below:

**Recommended Action:**

□ Accept

□ Minor Revision

□ Major Revision

□ Reject and Resubmit as New

□ Reject