

GRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING (PPGEA/UFES)

PUBLIC CALL 14/2018: SELECTION OF FOREIGN APPLICANTS

(MASTER'S DEGREE – CLASS 2019/01)

ERRATA

The Graduate Program in Environmental Engineering (PPGEA) of the Federal University of Espírito Santo (UFES) is selecting foreign applicants for its master's degree, starting March 2019. The program has three focus areas: AIR POLLUTION, WATER RESOURCES and ENVIRONMENTAL SANITATION. Classes are taught in Brazilian Portuguese. The target audience of this selection process is applicants who have finished undergraduate courses and/or who hold a master's degree related to the lines of research of PPGEA, and who have projects connected to the professors/supervisors of this Program. Applicants may become full-time or part-time students, but scholarship holders must become full-time students. The master's degree lasts up to 2 (two) years, including the fulfillment of credits in disciplines, development of research and thesis, but it can be extended for 1 (one) more year, due to specific situations.

1. APPLICATION

Date: All applicants must register in the period between **October 22nd** and **November 13th**, 2018.

Notice: applications will be accepted only if they meet the requirements described in Section 2 of this document.

Address: Universidade Federal do Espírito Santo, Centro Tecnológico, Secretaria do PPGEA, Prédio CT-VI, sala 210, Av. Fernando Ferrai, nº 514, Goiabeiras, CEP 29.075-910, Vitória - ES, Tel.: +55 27 3335-2324, ramal (extension) *9510

Notice: The documents for application may be sent by mail, through SEDEX, FEDEX or other type of registered mail. For the registration to be accepted, documents must be delivered at the PPGEA Secretariat until **November 13th**, 2018. Applications which do not meet this deadline will not be approved.

Office Hours: 9 AM to noon.

Target Audience: Professionals with undergraduate courses related to the lines of research of PPGEA and projects of the professors/supervisors of this program (please read carefully Section 4 of this document).

2. DOCUMENTS FOR APPLICATION

Documents for application must be sent/delivered in a sealed envelope, with the full name of the applicant and the chosen focus area written on it, organized in the following sequence:

- Application form (Annex 1), with a photo (size 3 x 4cm).
- Score Table of *Curriculum Vitae* (LATTES type, simplified version, from CNPq) – filled and signed by the applicant (Annex 2)^{##}.
- Spreadsheet for evaluation of Qualifying Stage (fill only the “*Coeficiente de Rendimento Escolar*”/GPA – Annex 3).
- Diploma of undergraduate course^{**} or a statement of expected date for graduation, provided by the official department of the higher education institution (copy – both sides).
- Transcript of Records of undergraduate course (copy).



- *Curriculum Vitae* [CV] (LATTES type, simplified version; in Portuguese or English) – print copy at <http://lattes.cnpq.br>.
- Passport (identification page, with photo – both sides).

Notice (only for applicants who are applying as regular students at PPGEA): 2 (two) letters of recommendation from a Professor/Researcher with a Doctoral Degree (Annex 4). They should be sent directly to the PPGEA Secretariat by the Professor/Researcher.

(**) The expected date for graduation described in the statement must be before the date of enrolment at the master's degree of PPGEA. Accepting this statement at the application DOES NOT MEAN that the applicant will be enrolled in the course (please check item 10).

(##) The Score Table will be checked by the Evaluation Commission of each focus area at PPGEA. The applicant must fill it and will be responsible by the information provided on such Table.

Notices:

1) The PPGEA Secretariat will not check the documents of the applicants at the moment of application/delivery, since applicants are responsible for the delivery of all documents required in this public call. The applicant is responsible for all information and documents provided in the application, which cannot be changed or added, for any reason.

2) At the end of the selection process, the documents of the applicants who were not approved will be available for at PPGEA Secretariat for 30 (thirty) days. After this deadline, these documents will be discarded.

3) PROOF OF PROFICIENCY IN ENGLISH LANGUAGE. **The proof of proficiency in English Language is a requirement for all regular students at PPGEA. This proof must be presented up to 5 (five) months after the first enrolment as a regular student at PPGEA.** One accepts the proof (original or copy registered at a notary office) of the following proficiency tests, with the MINIMUM GRADE (between parentheses), taken in the last 2 years, considering the date of presentation at PPGEA: Nucleo de Linguas/UFES (6,0); VEC Online Score (66-73), Approximate VEC level (11-12), CEFR (B2), Cambridge Exam (FCE) IELTS (5,5-6,0); TOEFL IBT (65-78); TOEFL CBT (183-210) e TOEFL ITP (513-547), TOEIC (605-780).. **Other proficiency tests will not be accepted.**

4) PROOF OF PROFICIENCY IN PORTUGUESE LANGUAGE. Regular students of PPGEA whose nationality is a Portuguese-speaking country (Angola, Cape Verde, Guinea Bissau, Equatorial Guinea, Macao, Mozambique, Portugal, Sao Tome and Principe and Timor Leste) are exempt from this proof. **Students of other nationalities are required to present the proof of proficiency in Portuguese language up to 5 (five) months after the first enrolment as a regular student at PPGEA.** The only proficiency test of Portuguese language accepted by PPGEA, taken in the last 2 years, considering the date of presentation at PPGEA, is Celpe-Bras (minimum grade: intermediate level) - <http://celpebras.inep.gov.br/inscricao/>.

3. CONFIRMATION OF APPLICATION

The confirmation of application by the Evaluation Commission will depend on the fulfillment of the items described on Section 2 (Documents for Application). The result of the confirmation of applications will be published according to the timetable 2, at the PPGEA Secretariat and on its website (<http://www.ambiental.ufes.br/>).

4. FOCUS AREAS

- The graduate program in Environment Engineering has three focus areas: AIR POLLUTION, WATER RESOURCES and ENVIRONMENTAL SANITATION.
- In the Application Form (Annex 1), the applicant must choose A SINGLE focus area.
- Additional information about focus areas, its lines and research projects can be obtained with PPGEA professors. One recommends, prior to the application, to contact professors who are offering vacancies (please check Section 5 of this call), and who are responsible for research

projects which might be of interest to applicants - to check for the professional profile required by such projects and/or related lines of research.

5. VACANCIES AND LINES OF RESEARCH

The graduate program in Environmental Engineering, in this selection process, offers up to 15 **vacancies** for the master's degree. The distribution of vacancies by professor is done considering the focus area and line of research, according to Table 1, available at (<http://ambiental.ufes.br/>). PPGEA reserves the right not to fulfill all the vacancies offered.

Notice: Vacancies in this call are offered both to Brazilians and foreigners, under equal conditions of competition.

Tabela 1: Vacancies and Lines

Orientador	Linha de pesquisa	Vagas Aluno Regular	Vagas Aluno Especial
Antônio Sérgio	1. Management of Internal and Coastal Waters	1	1
Diogo C. Buarque	1. Computer Modeling Applied to Sanitation	3	1
	2. Water Conservation in Built Environments		
Edumar R. C. Coelho	1. Treatment of water and waste produced in water treatment plants	1	
Elisa V. Goulart	1. Dispersion in urban areas	2	
Jane Meri Santos	1. Mathematical Modeling of Atmospheric Processes	1	
	2. Air Quality in Urban Environments.	1	
José Antônio Tosta	1. Optimization and Multicriteria Analysis applicable to the management of inland water resources	1	
Neyval Costa Reis Jr.	1. Air Quality in Urban Environments	1	
Renato Ribeiro Siman	1. Sanitation, Energy and Product Recovery	2	1
Sérvio Túlio Cassini	1. Microbiology applied to sanitation and bioenergy	1	
Valdério Anselmo Reisen	1. Mathematical Modeling of Atmospheric Processes	1	

6. SELECTION CRITERIA

The selection of applicants for the master's degree, by focus area, will be done according to the following items, in the case of Regular or Special student in disciplines:

6.1. Regular Students

The selection of regular students comprises two stages: an eliminatory stage (Stage 1, section 6.1.1) and a qualifying stage (Stage 2, section 6.1.2).

6.1.1. Stage 1 – Eliminatory Stage

a- General Knowledge Test – multiple choice test about Mathematics, Physics, Chemistry and Biology (please check Annex 5 for contents and bibliography). Applicants are not allowed to use a calculator during the test.

b- Elimination of Applicants – applicants who fail to score a minimum of points will be eliminated from the selection, as follows: 1) score a minimum of FOUR QUESTIONS in at least two of the tests (Mathematics, Physics, Chemistry and Biology); and 2) score a minimum of TWO QUESTIONS in the other two tests.

- **From the applicants who are not eliminated:**

- ✓ The 12 best ranked ones in the multiple choice test who applied for the focus area “Air Pollution” will be allowed to take part in Stage 2 of this selection process.
- ✓ The 4 best ranked ones in the multiple choice test who applied for the focus area “Water Resources” will be allowed to take part in Stage 2 of this selection process.
- ✓ The 14 best ranked ones in the multiple choice test who applied for the focus area “Environmental Sanitation” will be allowed to take part in Stage 2 of this selection process.

6.1.2. Stage 2 – Qualifying Stage

This stage comprises an interview and analysis of *Curriculum Vitae* (CV). One should notice that applicants approved for Stage 2 (according to Section 6.1.1) will be evaluated in the chosen focus area, according to the choice in the application form.

A) ANALYSIS OF CV. The analysis of Curriculum Vitae (if possible, LATTES type, simplified version of CNPq) will be done according to the following items (period of analysis: 60 months prior to the publication of the call):

- Publications (papers published in national and/or international indexed journals, books, book chapters and full conference papers).
- Officially registered internships.
- “Scientific Initiation” programs.
- MBA and/or master's degree in the field of Environmental Engineering or related fields.
- Courses attended at PPGEA as a special student (non-regular student).
- Participation as researcher in research projects.

The applicant should score his/her curriculum according to Table 3 (Annex 2), based on the CV (LATTES type, simplified version of CNPq) submitted. That is, any score indicated on Table 3 should match to the description in the CV. The contents of Table 3 (filled by the applicant) will be checked by the Evaluation Commission.

B) INTERVIEW. It will be conducted by the professors of each focus area chosen by the applicant, with duration of 10-15 minutes, to evaluate the following items:

- Compliance of applicant's professional profile with the lines of research/research projects offered by the professors, according to Table 1.
- Ability to dedicate oneself to the course (part-time or full-time).
- Letters of Recommendation.
- Oral communication skills.
- Transcript of Records of undergraduate degree.

In order to register interview scores, the form shown on Table 4 will be used (Annex 3). Notice: In this form, the applicant should write only the GPA (CR) described in his/her Transcript of Records. This information will be checked by the Evaluation Commission.

The qualifying grade (N2) of Stage 2 of the selection will be given for the applicant based on the evaluation spreadsheet (Table 4) filled by the Evaluation Commission, considering: the grade (N1) related to the analysis of CV; the professional profile of the applicant; ability to dedicate to the course; letters of recommendation; oral communication skills; transcript of records.

The ranking of applicants (from the first to the last one) will be done in descending order of grades (N2) given to them. In case of draw of grade N2, for two or more applicants, the applicant with the best grades in "professional profile" will be best placed. If the draw persists, one will use the best grade given for "curriculum vitae".

The final ranking of selected applicants (for regular students) will be published as a list per focus area, including lines of research/projects and supervisors. Grades from Stage 1 will not be considered for the final ranking of applicants.

6.2. Special Students in Disciplines

The selection of Special Students in Disciplines will take into account all applicants who chose one of the following options in the Application Form/Item 1: "REGULAR STUDENT OR SPECIAL STUDENT IN DISCIPLINES OF PPGEA" or "SPECIAL STUDENT IN DISCIPLINES OF PPGEA". In the first option, one refers to applicants who run for a regular student vacancy and who were not selected for this category. In the second option, applicants who run only for a vacancy of special student in discipline.

The selection of applicants for the option "SPECIAL STUDENT IN DISCIPLINES OF PPGEA" has only a qualifying stage, following the instructions of Section 6.1.2 of this call, that is, the same procedure for a regular student. Applicants for the option "REGULAR STUDENT OR SPECIAL STUDENT IN DISCIPLINES OF PPGEA" will have their N2 grades defined at the end of the selection process for a regular student, which will be used for qualification/selection of applicants who intend to be special students in disciplines. The list of selected applicants will be published according to the focus area. The special student in discipline will be supervised by professor member of PPGEA who has (or has not) offered vacancies for students in this call (Table 1).

7. SCHOLARSHIPS

We state that the master's degree in Environmental Engineering at UFES does not require the payment of any tuition fee. However, the student is responsible for using his/her own resources for traveling to Brazil and back to his/her home country, and for purchasing health insurance in Brazil and for presenting a proof of scholarship from funding agency in his/her home country or in Brazil. In Brazil, students can apply for a scholarship in agencies such as: CNPq (www.cnpq.br) and Capes (www.capes.gov.br), and programs like PEC-PG (Programa Estudantes Convênio de Pós-graduação).

Federal agencies (Capes and CNPq) and a state agency (Fapes) offer scholarships for regular students. Scholarships are limited and their distribution follows competitive criteria, based on the availability of scholarships for each focus area of the program. The criteria for distribution of available scholarships at PPGEA are defined by the Scholarship Commission and approved by the board of professors.

8. THE SELECTION COMMISSION

For this call, the selection process will be carried by the Selection Commission, whose members are Professor Jane Meri Santos, Ricardo Franci Gonçalves and Antonio Sergio Ferreira Mendonça.

Among its duties, the Selection Commission will confirm and publish the applications for the selection process, according to Section 3 of this call, and will forward to the Board of PPGEA, for confirmation, the list of applicants approved in this selection process.

Situations not described in this call will be decided by the Selection Commission. In the case of appeal against the work of this Commission, the Coordination of PPGEA will perform intermediation, as a first measure to solve disputes. At the moment of application, applicants for this Selection Process become aware and accept the items described in this call.

9. DATES AND VENUES

TABLE 2: General Schedule of the Selection Process, including stages of appeal for a review of results.

Stage	Date	Time	Venue/Notice
Publication of Call	October 22 th , 2018	4 PM	http://www.ambiental.ufes.br
Applications	October 22 nd to November 13 th , 2018 <i>If sent my mail, received at PPGEA only until November 13th, 2018</i>	9 AM to noon	UFES, CT, Secretaria PPGEA Prédio CT-VI, sala 210
Confirmation of Applications	November 14 th , 2018	Until 4 PM	UFES, CT, Secretaria PPGEA Prédio CT-VI, sala 210 http://www.ambiental.ufes.br
STAGE 1 (Tests)	November 19 th , 2018	9 AM to noon (Math, Physics, Biology and Chemistry)	UFES, CT Building and Room to be announced
Results (Stage 1)	November 21 th , 2018	Until Noon	UFES, CT, Secretaria PPGEA Prédio CT-VI, sala 210. http://www.ambiental.ufes.br
Appeal (Stage 1)	November 21 th to 22 th , 2018	9 AM to noon	UFES, CT, Secretaria PPGEA Prédio CT-VI, sala 210
Result of Appeal	November 26 th , 2018	Until 4 PM	UFES, CT, Secretaria PPGEA Prédio CT-VI, sala 210 http://www.ambiental.ufes.br
STAGE 2 (Interviews)	November 28 th to 30 th , 2018	9 AM to noon and 1:30 PM to 4:30 PM	Local a definir. Poderá ser realizada por video-conferência.
Results (Stage 2)	December 3 rd , 2018	Until 4 PM	UFES, CT, Secretariat PPGEA Prédio CT-VI, sala 210 http://www.ambiental.ufes.br

Appeal (Stage 2)	December 4 th to 5 th , 2018	9 AM to noon	UFES, CT, Secretariat PPGEA Prédio CT-VI, sala 210
Result of Appeal / Final	December 7 th , 2018 (maximum deadline)	Until 4 PM	UFES, CT, Secretariat PPGEA Prédio CT-VI, sala 210 http://www.ambiental.ufes.br
Enrolment (*)	To be announced	To be announced	UFES, CT, Secretariat PPGEA Prédio CT-VI, sala 210

(*) **Notice:** applicants approved in this selection process can only become PPGEA students after enrolment in the program, in the dates and times to be announced by e-mail and on the website. The approval of any applicant in this selection process will not be valid if such applicant does not enroll in the appropriate period.

ANNEX 1

APPLICATION FORM FOR SELECTION OF STUDENTS FOR **MASTER'S DEGREE**

01- CHOICE OF APPLICATION:

- () REGULAR student at PPGEA
() REGULAR student or SPECIAL STUDENT IN DISCIPLINES at PPGEA
() SPECIAL STUDENT IN DISCIPLINES at PPGEA

Photo
3 x 4 cm

02- CHOICE OF FOCUS AREA:

- () AIR POLLUTION () WATER RESOURCES () SANITATION

03 - APPLICANT'S DATA:

Name: _____
Address: _____
District: _____ City: _____
Postal code: _____ State _____ Tel: _____
Mobile _____
Marital Status: _____ Date of birth: ____/____/_____
Nationality: _____ Place of birth _____
CPF: _____ ID. _____ Issuing Agency. _____ Date of
Issue _____ e-mail): _____

4 - EDUCATION:

Undergraduate course: _____
Institution: _____
Beginning: ____/____/____ End: ____/____/____
Graduate Course:
MBA: _____

5- PROFESSIONAL DATA:

Company: _____ telephone: _____
Address: _____
City: _____ State _____ Weekly hours: _____
Position: _____

Place _____, Date _____

Applicant's Signature

ANNEX 2

CURRICULUM VITAE SCORE

Table 3: Curriculum Vitae Score (to be filled by the Applicant)

(Notice: score CV only with information from 2012-2018)

CV Evaluation Item (##)	Single Score	Maximum Score	Total Score(**)
Publications in national or international indexed journals	1,0	6,0	
Publications/presentations in national or international conferences	0,3	3,0	
Technical books	1,0	3,0	
Chapters of technical books	0,3	3,0	
MBA in Environmental Engineering or related areas (>= 360h)	0,5	1,0	
Master's degree, per diploma	1,0	2,0	
"Scientific Initiation" (12 months) in Environmental Engineering or related areas	0,4	1,6	
Internships (12 months) in Environmental Engineering or related areas	0,3	0,9	
Disciplines taken in PPGEA (passed)	0,2	0,6	
Participation as researcher in research projects, per year	1,0	3,0	
TOTAL (N1)			
<p>(**) Total of points to be calculated by the applicant. The score table will be checked by the Evaluation Commission of the Selection Process. The applicant is responsible for the information provided here, with the possibility of disqualification in the Selection Process.</p> <p>(##) Each item of evaluation of CV must be proven, by attaching (at the moment of application) a copy (one or two pages) of a supporting document.</p>			

NAME OF APPLICANT: _____

FOCUS AREA: () AIR POLLUTION
 () WATER RESOURCES
 () ENVIRONMENTAL SANITATION

Place _____, Date _____

 Applicant's Signature

ANNEX 3

Evaluation of Qualifying stage

(To be filled by the Evaluation Commission; except for GPA/CR)

TABELA 4: Spreadsheet of Evaluation – 2nd stage of selection

Evaluation Item	Score Range	Score Range (Special students in Disciplines)	Obtained Score
Curriculum Vitae (N1M)**	0,0 – 2,5	0,0 – 2,5	
Compliance of applicant's professional profile to the lines/research projects offered by professors according to Table 1	0,0 – 3,0	0,0 – 3,5	
Ability to dedicate oneself to the course (part-time or full-time)	0,0 – 1,5	0,0 – 2,0	
Letters of recommendation (only for regular students)\$§	0,0 – 1,0		
Oral communication skills	0,0 – 1,0	0,0 – 1,0	
Transcript of Records of undergraduate course	0,0 – 1,0	0,0 – 1,0	
TOTAL (N2)			
<p style="text-align: center;">(**) N1M: N1 Grade Modified (Modified Grade of Curriculum Vitae):</p> <p>a) N1_N equal to 0,0: N1M = 0,0 b) N1_N less ore qual to 5,0: N1M = 0,25 c) N1_N between 5,1 e 7,0: N1M = 0,5 d) N1_N between 7,1 e 8,0: N1M = 1,5 e) N1_N between 8,1 e 9,0: N1M = 2,0 f) N1_N between 9,1 e 10,0: N1M = 2,5</p> <p style="text-align: center;">N1_N: N1 Grade Normalized:</p> <p>N1_N = (N1 x 10) / N1max; Being N1max the highest grade obtained by the applicant of the focus area at PPGEA chosen by the applicant and N1 the score of <i>Curriculum Vitae</i> (Table 3)</p> <p style="text-align: center;">(##) Transcript of Records: GPA (CR) = _____</p> <p>a) GPA less than 5,0: Score = 0,0 b) GPA between 5,0 e 7,0: Score = 0,3 c) GPA between 7,0 e 8,5: Score = 0,6 d) GPA between 8,5 e 10,0: Score = 1,0</p> <p style="text-align: center;">(\$\$) Letter of recommendation:</p> <p style="text-align: center;">Score to be given by the Evaluation Commission of the focus area of the applicant, considering the global assessment of the two letters of recommendation.</p>			

NAME OF APPLICANT: _____

FOCUS AREA: () AIR POLLUTION
 () WATER RESOURCES
 () ENVIRONMENTAL SANITATION

ANNEX 4

LETTER OF RECOMMENDATION – MASTER’S DEGREE

FIELD A – TO BE FILLED BY THE APPLICANT:

Dear candidate, please fill item 1 of field A, and send this form to an evaluator of your choice who holds a doctoral degree. The evaluator can be a professor, a technical supervisor or equivalent.

A.1.Applicant’s Data:

Name:
Undergraduate Course:
Date of Graduation:
Home Institution:

FIELD B – TO BE FILLED BY THE EVALUATOR:

Dear evaluator, please fill this form and send it (sealed) to the applicant or to the secretariat of PPGEA.

This form is part of the selection process of the MASTER’S DEGREE in Environmental Engineering. If you do not know the applicant well enough to provide the requested information, leave item B.2 blank.

B.1 Evaluator Data:

Name:.....
Highest level of Education:
Institution where you got the degree described above.....
Institution or company where you work:..
Position:

B.2 Evaluation of applicant:

- **I have known the applicant for (years) as:**
 - () na undergraduate student. () supervised student in final project
 - () supervised student in scientific initiation () researcher in a project.
 - () others (specify)
- **Out of ____ people that I met in similar situations, the applicant is ranked as:**
 - () among the 5% best (10 points) () among the 50% best (4 points)
 - () among the 10% best (9 points) () among the 50% worst (0 points)
 - () among the 20% best (7 points)
- **Classifique o candidato em relação aos seguintes aspectos:**

Intellectual Skills:	poor	0	1	2	3	4	5	6	7	8	9	10	excellent
Individual Work skills:	poor	0	1	2	3	4	5	6	7	8	9	10	excellent
Team Work skills:	poor	0	1	2	3	4	5	6	7	8	9	10	excellent
Iniciative:	poor	0	1	2	3	4	5	6	7	8	9	10	excellent
Creativity:	poor	0	1	2	3	4	5	6	7	8	9	10	excellent
Oral and written expression. skills:	poor	0	1	2	3	4	5	6	7	8	9	10	excellent

B.3 In your opinion how is the applicant suited to a postgraduate course? (mandatory)

Poor 0 1 2 3 4 5 6 7 8 9 10 excellent

Date ____/____/____

Signature of Evaluator

Options for sending mail: 1) Secretaria do PPGEA. Centro Tecnológico. Universidade Federal do Espírito Santo. Prédio CT-VI, sala 210. Av. Fernando Ferrari, nº 514, Goiabeiras. 29075-910 Vitória-ES; 2) e-mail: pos.engenhariaambiental@ufes.br, em arquivo PDF ou JPG. Assunto da mensagem: Carta de Recomendação - Nome Candidato – Seleção PPGEA

ANEXO 5

GENERAL KNOWLEDGE TEST (The use of calculator is not allowed)

CONTENTS AND RECOMMENDED BIBLIOGRAPHY

PHYSICS

CONTENT: 1 – Leis de Newton. Inércia, Movimento, Ação e Reação, Gravitação universal. 2 – Movimento de uma partícula. Vetores. Deslocamento. Velocidade. Aceleração. Movimento unidimensional, bidimensional e tridimensional. 3 – Propriedades físicas dos fluidos. Massa específica, Peso específico, Tensão superficial, Modulo de compressibilidade, Pressão de vapor, Calor específico, Viscosidade. 4 – Cinemática dos Fluidos. Trajetória, Linha de corrente, Circulação, Rotacional. 5 – Hidrostática. Capilaridade, Empuxo, Forças sobre superfícies planas, Manômetros. 6 – Dinâmica dos Fluidos. Força, Quantidade de movimento, Energia cinética, Energia potencial. Equação de Bernoulli. 7 – Termodinâmica e Transferência de Calor. Leis da Termodinâmica. Condução de calor, Convecção de calor.

Bibliografia Recomendada:

RESNICK, Robert; HALLIDAY, David; KRANE, Kenneth S. *Física*. 4. ed. Rio de Janeiro: Livros Técnicos e Científicos Editora S.A., 1996.

STREETER, Victor L.; WYLIE, E. Benjamin. *Mecânica dos Fluidos*. 7 ed., São Paulo, MacGraw-Hill do Brasil, 1982.

TIPLER, Paul A. *Física Para cientistas e engenheiros: Gravitação, Ondas e Termodinâmica*. Vol. 2, 3.ed., LTC – Livros Técnicos e Científicos Editora S. A., 1995.

FOX, Robert W.; McDonald, Alan T., *Introdução à Mecânica dos Fluidos*. 4 ed., LTC – Livros Técnicos e Científicos Editora S.A., 1998.

MATEMATICS

CONTENT: (1) Cálculo: Derivadas de polinômios (expoentes inteiros e fracionários). Máximo e mínimo de funções polinomiais. Integrais definidas e indefinidas de funções polinomiais. Representação gráfica de funções (linear, quadrática, exponencial e logarítmica). (2) Estatística descritiva: População. Amostras. Tabelas de frequências. Histograma. Medidas de tendência central (média e mediana). Medida de dispersão (variância e desvio padrão). Estimativa dos parâmetros populacionais; média e variância. Intervalo de confiança. (3) Álgebra linear: sistema de equações lineares e matrizes.

Bibliografia Recomendada:

THOMAS, George B. Jr.; FINNEY, Ross L. *Cálculo e Geometria Analítica* Rio de Janeiro: Livros Técnicos e Científicos, 1988.

SIMMONS, George F. Tradução de Seiji Hariki. *Cálculo com Geometria Analítica*. São Paulo: Macgraw-Hill do Brasil, 1987.

FONSECA, Jairo Simon da; MARTINS, Gilberto de Andrade; TOLEDO, Geraldo L. *Estatística Aplicada*. 2. ed. São Paulo: Atlas, 1985.

BIOLOGY

CONTENT: (1) Biologia celular e metabolismo: Células procariótica e eucariótica; sistemas de classificação dos seres vivos; caracterização dos microrganismos: vírus, bactérias, algas, protozoários, fungos; tipos de metabolismo e nutrição dos seres vivos; metabolismo heterotrófico: respiração e fermentação; metabolismo autotrófico: fotossíntese e quimiossíntese; enzimas e cinética enzimática. Genética microbiana. Biotecnologia e DNA recombinante. (2) Ecologia: Ecossistemas, habitat, nicho, níveis tróficos, comunidades; interações entre seres vivos: comensalismo, mutualismo, sinergismo, antagonismo, competição, neutralismo. Comunidades aquáticas: fitoplâncton, zooplâncton, bentos; ciclos do carbono, nitrogênio, fósforo e enxofre na biosfera.

Bibliografia Recomendada:

MADIGAN, Michael T.; MARTINKO, John M.; PARKER, Jack. 10. Ed. *Microbiologia de Brock*. São Paulo: Pearson do Brasil, 2003.

TORTORA, GJ. *Microbiologia*. Artmed Editora SP. 8ª. Edição 2005

ODUM, Eugène. *Ecologia*. Rio de Janeiro: Guanabara Koogan, 1988.

CHEMISTRY

CONTENT: (1) Química inorgânica: Soluções; equilíbrio químico; reações redox; cinética química e ordens de reação; ácidos, bases, sais, pH, pKa, sistemas tamponantes. (2) Química orgânica: Propriedades dos compostos orgânicos; compostos alifáticos e aromáticos; mecanismos de reações; compostos naturais: carboidratos, óleos, gorduras e proteínas.

Bibliografia Recomendada:

MAHAN, Bruce H. *Química: um curso universitário*. São Paulo: Edgar Blucher, 1986.