A. General safety lab rules for lab 016 (AG Lee/Lab Lee):

1. Only persons with official allowance from the supervisor and who have read the safety rules and verified this by a signature (on the list provided by Dr. Wolfgang Schwarz) as well as signed the "Verpflichtungserklärung" (www.environmental-microbiology.de/lab_issues.html) are allowed to visit and work in the lab.

2. All rules listed in http://mibio.wzw.tum.de/index.php?id=69 apply to our lab too, here a short summary of the most important rules:

   a) Do not eat, drink or smoke in the lab. Smoking is only allowed outside the building.

   b) Keep work areas clean and clear. Use clean water and then appropriate disinfectant (70 % EtOH) to clean work areas and equipment (before and after work). Be sure to label all items that you use with your initials, date and short info about the contents – where appropriate, use safety labels. If unlabeled things are found in the lab, these will be thrown away! Keep a proper record of all your reagents and samples.

   c) A lab coat, gloves and, where appropriate, safety glasses should be worn during laboratory work. Use your sense for gloves - try to minimize the usage of gloves (to minimize waste) and don't touch everything with gloves, especially not door handles, telephones etc).

   d) Wash your hands thoroughly with soap before and after working with microorganisms. Where appropriate, disinfect hands with "Sterilium" (use blue liquid next to the wash basin).

   e) Check appropriate info about your chemicals before you start to use them. Check for their chemical properties and safety instructions in the folder assigned for this. If data is missing in the folder, look up in the internet and print out the safety sheet and place it in the folder. Check also the compability of various chemicals to each other (if they can be mixed and if so, how; if they can be autoclaved together, if they have to be autoclaved separately or sterile filtered etc).

   f) Chemical waste should be deposited appropriately. For the following chemicals, use special trays in the extractor hood – discriminate between liquid and solid waste respectively:
      - PFA (Paraformaldehyde) and Formamide (for FISH experiments).
      - Nucleic acid stains (DAPI, SYBRGreen).
      - Nucleic acid extraction reagents.
      - Other waste, such as acidic-alkaline waste, chlorinated solvents etc.

   g) Microbial waste (live, non-pathogenic) – deposit all solid waste in the plastic bag for autoclavation, deposit all liquid waste in bottles, which will then be autoclaved. Avoid overfilling waste bags!

   h) All cloning work and other work with gene manipulated organisms GMO must first be discussed with the supervisor. No kind of GMO are allowed to leave the lab. Treat waste from GMO work as microbial waste.

i) If you work outside official working hours (approximately Mo-Fri 07:00-19:00), avoid doing dangerous things alone. Where appropriate notify supervisor or any other relevant person present at the department. Enter your name into the "presence list" (on the door to the lab) so that the security guards will know who is present at the department.

3. When you leave the lab, check that all equipment that was used only temporarily (e.g. water baths, hybridization ovens, gas) are switched off. Check that all doors to refrigerators, freezers are properly closed. Close all windows, turn off the computers and the light, and lock the lab door.

4. Check out the location of the first aid kit (in lab 010, where the chemical supplies and glass ware are stored), emergency shower (above the door) and the eye-wash station (close to the wash basin).

5. Check out the emergency exit. A rescue map can be found on the door. In case of fire alarm (siren howling) switch off dangerous equipment (e.g. centrifuges, gas-burners), inform coworkers, and leave the building. Fire extinguishers and fire blankets can be found in the corridor outside the lab. Obligatory meeting point is the place in front of the main entrance of the institute.

6. Report all accidental events (e.g. spills, broken equipment) to your supervisor and discuss how they should be handled.

7. In case of emergency: make sure that you are ok before you help anyone else. List of phone numbers for first help in case of an accident:

Safety commissioner	Dr. W. Schwarz Dr. W. Ludwig	-5445 (internal) - 5451 (internal)
First help	Dr. W. Schwarz Dr. W. Ludwig	-5445 (internal) - 5451 (internal)
Emergency call	Emergency physician	9622 (internal)
	Fire department	112 (internal)
	Rescue headquarter	0-19222
Toxin emergency call		0-089-19240

No lab work is allowed until these instructions have been read and signed on the list of safety instructions acknowledgements at department of microbiology TUM (Dr. W. Schwarz). In addition to this, a special commitment form* ("Verpflichtungserklärung", www.environmental-microbiology.de/lab_issues.html) **must be signed by the student and handed over to the supervisor.**

B. General lab rules for lab 016 (AG Lee/Lab Lee):

For your overall safety and sound systematic lab work, apply the rules of "Good laboratory practice", check for example the following links:

- http://en.wikipedia.org/wiki/Good_Laboratory_Practice
- http://www.sjsu.edu/faculty/chem55/55glpout.htm
- http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2213906/

General recommendations:

1) Rule number one: Use your common sense and THINK critically precisely about why and how you should proceed with your work….! Allow all to take it´s proper time. There is no need to haste, if you wish to hurry, do it slowly and wisely… :o)

2) Do not use any equipment or reagents without proper instruction or knowledge.

3) Check out all your lab equipment, including pipettes, and reagents. Keep everything clean and where appropriate sterile. Be critical when taking glass-ware, using spoons/spatulas etc from the general stores, rinse therefore with distilled water prior to use and check that stoppers are clean and whole.

4) Label everything properly (initials, date, contents and where appropriate a safety label).

5) Keep your lab place (as well as other working areas you may occasionally visit) tidy at all times. Avoid overfilled waste trays etc. Avoid storing unnecessary things on your lab space (or elsewhere) for longer periods. It is recommended to prepare record lists/tables of all your lab material (containing name of sample/reagents, data, responsible person, purpose of sample/reagents, link to origin of protocol, receipt etc).

6) If you borrow something or occupy a place outside your own lab space, be sure to notify other about this and leave a note with your initials, data and other relevant info. Please do not forget to hand back borrowed items.

7) Keep your own solutions, autoclaved material etc. You may borrow from the general stores in the lab or from other lab mates but check out that their origin is well known. If there is any doubt, discard them and prepare your own solutions and material. It is better to be absolutely sure than just vaguely sure, hoping to save time out of inefficient laziness….There is nothing wrong with being lazy, but do it intelligently :o) !!!

8) Don't throw away any of your ongoing work until it has been clarified with the supervisor if this would be ok.

9) Where appropriate, prepare duplicates or triplicates (e.g. für long term storages). Clones must be regularly reinocculated (about every 4-6 weeks), on media with appropriate antibiotics. Nucleic acids can be stored for shorter periods at +4 Degrees C, for longer periods at -20 or even at -80 Degrees C.

10) Do not store samples on trays in the refrigerator or freezer. Use boxes or plastic bags which are properly labeled. Try to fill the boxes completely until you use another box to optimize space in the freezers. Label your boxes properly – note, remove all traces of former labels.

11) Do not re-order things in boxes and shelves etc without other´s approval.

12) If you discover that some supplies or reagents are getting used up, please report this to your supervisor or lab mates. Do not just empty stocks and reagents!

13) Do not take anything for granted. Always double check protocols, calculations and references. Even data in publications can occasionally be wrongly cited, calculations for chemicals and media wrong etc. A critical mind is the first step to success and proper systematic work! Do not get de-inspirited by occasional failures, these often provide to be the best lessons for essential insights. Be creative and learn from all you do!

14) When you finish your lab work (after every type of work and of course at the end of your project), clean up all spaces that you used.

C. General rules for lab protocols for lab 016 (AG Lee/Lab Lee):

1) Always make notes about all your experiments, in a bound notebook provided by the department. Do not use a pencil, do not tear out pages, write clearly so that others can follow your work afterwards) – this notebook is official property of the institute and must be returned back at the end of your work at the department (you may of course make a copy of this book).**Advice: keep easily traceable links to your notes, experiments, raw data files and references.**

   You may also create an electronic notebook for further detailed comments, but see to that also here easily traceable links are kept between the manual and the digital notebook, as well as all protocols and raw data (e.g. references, image files, sequence files). Some examples of guidelines for lab books:
   - http://misterguch.brinkster.net/sept2000.pdf
   - http://www.ruf.rice.edu/~bioslabs/tools/notebook/notebook.html

2) Where ever appropriate take pictures and document them properly.

3) **Record all your data and samples (on the lab place, refrigerator, freezer etc) as soon as possible** with the following data:
   - Name (including how they are labeled in the box in your freezer, use appropriate labels for lid and tube)
   - Date;
   - Project;
   - Sample (origin, amount, date, how much has been used/how much is left over for what and where can those results be found) – label both lid and tube (e.g. use labels with different colors for different categories). Write clearly!
   - Reagents (origin (company and product number), amount, date, how were they prepared, how much has been used/is left over)
   - How the samples were processed (with a reference to your lab book or report)
   - Storage mode (name or number of box in which kind of freezer)

   Advice: To simplify labeling of items, use a simple code (e.g. initials, date and a number or alphabetical code) on a label, placed both on the lid as well as on the tube or bottle or similar. Then enter this code into a table where more detailed information can be added.

15) Collect and copy all raw data as soon as possible. Do not save this to the end of your internship, data can get lost!!!

16) Prepare regular back ups of all your data. **Note that every type of raw data, reference and result file (report, evaluation files, figures, databases, seminar must be saved and handed back to the department** (2 printed copies of the end report (for the supervisor and the head of the department), 1x hardcover version of all files and data (including reports, figures, calculations, seminar), and 1 digital copy version) at the end of your work, or when you are asked to do this.

C. General rules for completion of lab work and preparation of reports (AG Lee/Lab Lee):

Requests and recommendations for completion of your project (internships, theses (bachelor, master, PhD) and application of your credit points:

a. Successful completion of your research project. Discuss schedule with your supervisor.

b. All samples, results (rawdata, original evaluation files, inventory lists etc) systematically documented and summarized in digital and written copies **(1 hardcopy, 2 digital copies (one for the supervisor, one for yourself).**

c. Lab bench cleaned up. All samples and reagents (on the lab bench, in the refrigerator, cooling room, minus 20 freezer, minus 80 freezer etc) properly labeled, collected and documented (discuss with your supervisor what to do with them).

d. Written research report (German or English, 2 hardcopies, 1 digital copy), well linked to all information about samples, rawdata, evaluation files, protocols, references, inventory lists of samples and reagents. The main thing with the report is that it is concise. A long report does not necessarily make it better.

e. Oral presentation (German or English, ~10-15 min for internships and bachelor theses, master and PhD theses 30-45 min). Arrange the dates for your presentations you're your supervisor. Dates for presentations of theses should be presented at the departments seminar series (usually Tuesdays 4 pm, contact the seminar organisator).

f. Fill in the form "praktikumsbeurteilungsformular (see paragraph A on http://www.environmental-microbiology.de/lab_issues.html) and email this to your supervisor. Please submit this minimum 2 weeks before the deadline.

g. Comment on deadlines: You set your own deadlines and you are free to manage your own time as it fits you best. But, please ensure that you notify your supervisor well ahead about suitable dates for meetings and deadlines for reports and credit registration. Normally around 1-2 weeks are needed to meet these however exceptions may happen (longer or shorter). The time frame must always be individually declared with the supervisor.

Guidelines for the written report (in German or English).

- Title page (with names (yours and the supervisor(s), project title, education level, dates, immatriculation number).
- Abstract (German AND in English) – max 0,5-1 page).
- Introduction (just a few pages, starting with e.g. the historical background and then moving to the current status and purpose of your project).
- Material and Methods: List up all samples, strains, methods and reagents (product number, company), including a list of references and abbreviations. You don't have to explain every method in detail. You are allowed to copy protocols from companies or websites, just ensure that you cite them properly.
- Results. Be sure to list up all necessary data as well as make a short introduction why a particular method or sample was used. All presented data must be properly explained. For example, for PCR gel images, you must mention which sample and PCR product is presented, what type of DNA ladder was used, how much amplificate was applied on the gel, the name of the original TIFF file and where it can be found).
- Discussion – do not just repeat results with words, discuss them. Be sure to not forget the whole scope and always mention shortly the background of your issues.
- Summary (max 0,5-1 page).
- References/web links. Where ever appropriate ensure that you cite everything correctly and order all references properly in file (as PDF files and where ever appropriate in a special reference software).
- Appendage:
  - additional raw data or protocols, if too large or complicated to list them up in the results part of your report.
  - inventory list of all contents on the DVD with the end report, seminar and all raw data, evaluation files, references.
- Recommended software: Microsoft windows or Linux based software (note, if you prefer to use latex, you must translate this into a word version – only PDF is not recommended).
- Oral presentation

All of this must be included in the report – with original preparation files (please do not just include the final PDF file).

Please prepare two hardcopies (printed versions), and one digital copy (on a CD or DVD).

A matter of courtesy and recommendation: Stay focused on your lab work and although you are free to use your time as it fits you best, please still try to perform non-urgent private issues (e.g. constant private mobile phone calls and private internet surfing/e-mailing even during lab work) during coffee breaks and lunches - where ever appropriate outside the lab.

Avoid doing too many things at the same time in the lab… less is often more! Spend appropriate time on thinking around your experiments and results. Don't worry about making mistakes – develop a critical mind where you strive to learn something useful from everything.

"Success is the ability to go from one failure to another with no loss of enthusiasm" - Winston Churchill

"In the fields of observation chance favors only the prepared mind" - Louis Pasteur