

# R.O.P. Biotechnology

J. Kirk Brown  
E104

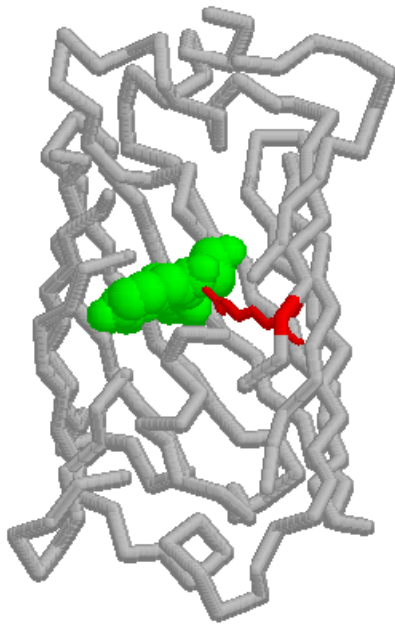
209-830-3360x2409

**OFFICE HOURS**

Weds 3-4 or by Appt.

## I. Course Description

**Prerequisite:** The successful completion of Biology and Chemistry.



This class is for those students who wish to learn more biotechnological techniques and want to work independently on a science project involving laboratory and library research. The class is designed for students who are resourceful, responsible, patient and interested in pursuing science work in the future.

In the first semester, students will learn lab techniques in biotechnology, keep a detailed lab notebook. The first semester grade will include lab practical exams, lab notebook checks. The second semester will be begin with continued mastery of lab techniques followed by performing independent projects, which will be extensions and further research of the techniques learned first semester. Students working at Tracy High will be limited to independent projects, which use the specific techniques, learned in class. Students wishing to have a project with a larger focus may be able to work with partners at Biorad, LLNL, or Applied Biosystems. The course will be offered on days that don't conflict with Theory of Knowledge for those students that wish to meet extended essay requirements.

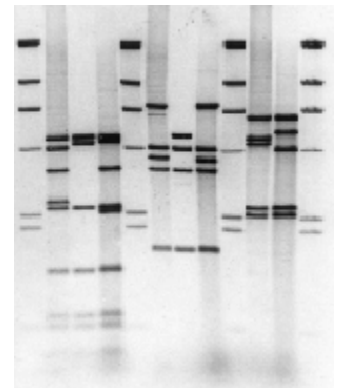
This course is designed to give students experience in some of the fundamental biotechnological techniques used in biological research and industry. Partnerships at Biorad Laboratories, Lawrence Livermore National Laboratory, Applied Biosystems, and other related companies

and Universities will guide and review the types of activities instructed to give students the best possibility of getting job right out of high school or a job while attending college. These partners also provide reagents and equipment to better meet student needs. This course receives A-G credit as elective credit.

## II. Course Outline for First Year Students

### First Semester Schedule

Weeks	Plans
1	COURSE INFORMATION/Lab Orientation Equipment and safety Keeping a Notebook Get safety contract signed
2	MICROPIPETS and their use MAKING SOLUTIONS Washing, Labels, Calculation Review
3	Making molar solutions Compound Solutions mg/ml Keeping lab notebook Digital camera use
4	Making compound solutions Safety Video (Practicing Safe Science) Making LB agar, LB amp, LB amp ARA Bacterial Transformation (CaCl <sub>2</sub> method)



5	RECOMBINANT DNA TECHNOLOGY (cont'd)
	Bacterial Transformation
6	PLASMID MINIPREP
7	Protein Purification
8-9	Restriction Digests (Restriction Mapping), Gel Electrophoresis and Analysis.
10	Presentations
11	PCR background
	Chelex Extraction methods
	Master Mix Prep
12	PCR of Alu (PV-92)
	Gels
13	Calculations and Mt PCR
14	Mt PCR and Cycling Reactions

## SECOND SEMESTER SCHEDULE

You will spend most of the second semester working on your individual lab experiments. In addition, you will be assigned a weekly meeting time with the teacher to discuss your 'game plan' and to trouble shoot. You will complete your final scientific research paper and your poster presentation in this semester. Some students may wish to enter a science fair.

15	Protein Extractions
16	Protein Electrophoresis
	Midterm Examination Written and Practical
17	ELISA Lab
	Background gathering for projects
	Plan which Science Fairs etc... that the student wants to enter project
	Materials and Methods Section Due
	Project Work
	<b>Project Presentations (Benchmark)</b>
	Introduction Section Due
	Work
	Work
	Work
	Work
	Abstract and Discussion Due
	Spring Break
	Work
	<b>BIOTECH CLASS OPEN HOUSE (some time this week)</b>
	Results Section Due with edits
	Presentations
	Presentations
	Lab Cleanup
	Finals <b>FINAL SCIENTIFIC PAPER AND PPT/POSTER DUE(Must turn in to pass the course for the second semester)</b>

**Second /Third Year Students:** Students will be required to serve as mentors for first year students. They will have proposals due, progress checks, they will need to take the midterm lab practical, and must turn in their **technical paper, and PPT presentation in order to pass the course.**

## III. Ground Rules and Expectations

For us to get along this school year there are a few rules that need to be followed.

**RULE #1:** Be courteous and thoughtful to others.

**RULE #2:** Be prepared to take notes, do labs, and participate in class. You will need to bring a three ring binder, lab book, pencil/pen, paper daily.

**RULE #3:** Stay in your seat during lectures and discussions.

**RULE #4:** Clean up the classroom before leaving. Plan your time accordingly

**RULE #5:** Observe all safety rules. If you break a safety rule you will receive a "0" and have to take a safety test. If after time you continue to be unsafe, you may be removed from the course due to the serious nature of the equipment used.

**RULE #6:** No cell phones, pagers, PDA's in class or lab. They need to be **completely powered off**. If one is on and goes off during a quiz or assessment, the student will receive a zero and will not be able to make up the assignment.

**Rule #7:** No drinking or eating in the classroom.

## IV. Behavior Steps and Consequences

If these basic rules are followed we will have no problems and the year will be very enjoyable and fun for all of us. If these rules are not followed then there will be disruptions and the learning process will be interrupted. If you choose not to observe these rules certain things will happen.

1. A verbal warning. Very brief.
2. The second time I have to ask you to do something you will be asked to stay after class so I might talk with you. At this meeting we will come up with a plan to help you observe the rules.
3. If the behavior continues I will call home and discuss my concerns with your parents in order to try to alleviate the problem.
4. If the behavior persists I will involve the administration and together we will devise a plan to alleviate the problem.
5. Support Room will be used in severe disruptions or when deemed necessary.

## V. Tardy Policy

The attendance policy will be followed as printed in the student handbook. Tardy policy will be followed as printed in the student handbook. You are Tardy if you are not in your seat at 7:00AM

## VI. Make-up/Late Work Policy

**Late Assignments** There should be no late assignments. **No late work will be accepted.**

**Absences** You are responsible for getting your missed assignments. **IT IS NOT MY RESPONSIBILITY TO REMIND YOU!!** If your absence is excused you may have one day for every excused day to make up the work. If you miss the day it was due, it is due upon your return. This includes exams. If you only miss the day of the exam you must take it upon your return to class. If you are to miss a class because of an extracurricular activity or field trip or an academic field trip, you are required to turn in any assignments due on that day before you leave for the activity.

## VII. Grading Policy

**YOUR QUARTER GRADE WILL BE BASED ON THE FOLLOWING INFORMATION:** This is an approximate breakdown. The Quarter grades will be based upon total points.

1. Approximately 50 % LAB WORK done directly into the lab notebook
2. Approximately 25% Authentic Assessment/Lab Practical
3. Approximately 25% Project Checks or Project.
4. 1<sup>st</sup> **Semester grades** will be based upon 40/40/20 weights from 1<sup>st</sup> Qtr, 2<sup>nd</sup> Qtr, and semester lab practical.

<b>Example:</b>	First Quarter	40%
	Second Quarter	40%
	Final Exam/Practical	20%
	Total	100%

## Grade Categories

100%-98%	A+	97%-93%	A
92%-90%	A-	89%-87%	B+
86%-83%	B	82%-80%	B-
79%-77%	C+	76%-73%	C
72%-70%	C-	69%-67%	D+
66%-63%	D	62%-60%	D-
Below 60%	Failure and or Failure to turn in required Paper, or PPT presentation		



I use a computerized grade book program as do most teachers at THS. This will generally be updated weekly or as new assignments are assessed. Grades are available to parents via Parent Connect or via emailed progress reports. Follow the district procedures to sign up to access your student's grades daily via the web.

## VIII. Assignments to Expect

**Authentic Assessments**. There generally will be a weekly assessment on the topics covered that week. They will be hands on in nature and be generated from the techniques that we are covering that week. They are graded by rubrics.

**In-class Assignments** will come at various times throughout the year and will be done in class.

Many of our assignments will be either all in class or a combination of in-class and homework.

**Homework** There will be homework assignments that relate to the topic being explored. There will also be other assignments throughout the year. Nightly, students should be reading about the procedures or background on the topics being explored as outline in the reading/pacing guide on class website.

**Lab Data book checks**: There will be biweekly notebook checks to see that information shared and protocols learned are in order and recorded in detail.

**Midterm assessment**. There will be a review of all the procedures, techniques and equipment reviewed up to that point in class. This will consist of a lab practical and brief written midterm. There will also be a **Final Assessment** that will cover the project and it's written documentation.

**Laboratory Assignments** We will be doing various lab exercises during the school year and you will be required to keep a lab data book. The laboratory results will be written up in proper format.

There will also be laboratory practical exams. See instructor for the format.

**Written Assignments** There will be various written assignments that will be assigned. These will be essays on various articles, discussions, and current events that will be explored.

**Oral Assignments** There will be many opportunities for oral presentations. Class presentations and other group and extra credit activities will also involve oral activities.

**Second Semester Project** There will be a required project that will be the focus of the second semester. Students will select one of the techniques covered the first semester and design a project that utilizes that technique. Students will complete the project and must turn in a PowerPoint Presentation Summarizing their findings and a written paper that is spiral bound. Students will be encouraged to enter the regional science fair and other competitions that are available. **Failure to complete any of these will result in failure for the semester.**

## IX. Academic Dishonesty

**Cheating** If you are caught cheating you will receive a "0" for the assignment. You will not be able to make the assignment up or do extra credit and could potentially fail the course. **Examples**: Copying someone's papers or laboratory write-ups, copying someone's drawings without looking at the slides, copying someone's hypotheses, Reading someone's report or copying out of someone's lab book,

taking and copying from a partners lab book, copying someone else's calculations, etc... Please ask questions. Write everything down as you do it and then follow proper lab book protocol.

## X. Extra Credit

**Extra Credit** There **may be** some very limited opportunities for extra credit. You can do extra credit only if you are not missing any assignments. No more than 5% of any grade period can be extra credit if offered.



I am sure that each of you will follow the rules and complete the assignments with pride and integrity. I hope you each have a very exciting year and I will do my best to see that this happens. If you have any questions, concerns or would like clarification on anything, I will be available at lunch or after school. I have a zero period class, so morning help would be very early! Please come in. I will be glad to help!

Wishing you a very successful year,



Mr. Brown

Office hours; Wednesdays from 3-4pm or anytime by appointment.

Phone number 830-3360x2409 Email: [kbrown@tusd.net](mailto:kbrown@tusd.net)

Web Site: <http://www.tracy.k12.ca.us/thadvbio>

Mr. Brown's Biotechnology Course Syllabus

Detach this portion of the outline and send back to school with your child. If you have any questions or concerns please call or come by!

I have read and understand this Biotechnology course outline.

---

Printed Name                      Student signature                      Date

---

Printed Name                      Parent/Guardian signature                      Date

Parents email address: \_\_\_\_\_

For email contact and progress reports ( Please print very clearly)