Seni r De ign Pr je :
The Culmination of Engineering Education

TYV C`]]VXV`VIE_XZ_VVcZ_X ReH VdeVc_NVh E_X]R_UU_ZgVcdZ¡ ac¡gZUVdR _f^SVc`Waa`cef_ZaVdWcf_UVcXdRUfReV/defUV_ed¡ XRZ_Vi aVcZV_TV h ZeY eVTY_Z¡R]cVdoVRcTY. O_V`Va eY^RZ_d¡ fcTVd`VeYZdgR¡fRS]V Vi aVcZV_TV Zd eYc fXY eYV T`^adVVV_dZgV SV_Z cDVdUX_Pc¡[VTe TYVdV_jVRc¡_X ac¡[VTed RdeYV TRadë_V`WgVgVj V_XZ_VVcZ_X defUV_ed VUfTRZ_ReH VdeVc_NVh E_X]R_UU_ZgVcdZ¡. TYV SV_Z cDVdUX_Pc¡[VTeR]]`h ddefUV_ed¡ Raa]j eYV \_`h]UXV eYVj YRgV]MRc_VUZ_T`fodVd¡ Z^ ac¡gV eYVV bfR]Z¡ `Wf^R_]ZVW. TYV ac¡[VTed T`^V Ve`^ R gRc¡Vj¡ `Vd¡ fcTVd h ZeY ë aZTdd R_XZ_X V`^ eYV UVdZX_R_UZ^ ac¡gV^V_e`Wd aVdeRZ_dR daRa_V^VcXV_Tj d¡¡`^ ë eYV Z_gVdeZXRdZ _`WdVh XdcV_V_VcXj d¡fcTVd. SV_Z cDVdUX_Pc¡[VTed YRgV cVdf]eVdUZ_Xc¡f_UZ_de_ Rg R_UacVdV_eRdZ_d. TYVj cVdf]jeZ_dZX_Z¡¡R_edRdRgZXdVWcë T`^aR_ZVd R_UcVR]-h¡c]dUVi aVcZV_TV WcXRdUufReZX V V_XZ_VVcd.

Biomedical Engineering

Actuated Finger Exoskeleton and Myo-Interface
FRTf]ej AUgZd`c Dc BcV_eU]cVj

Organ Printer
FRTf]ej AUgZd`c Dc BcV_eU]cVj

KRYcR A]\YRSSRk
DR\`eR FVcXfd`_

MZTYRV]AcV_R

Civil and Environmental Engineering

SENIOR DESIGN PROJECTS

STUDENT(S)

New Academic Building Preliminary Design:
3 Story, Steel Framed, Slab on Grade Building founded on Clay Soils
FRTf]ej AUgZd`c Md AdY]Vj Sf]]ZgR_

KVgZ_G]RkVc
Rj R_ PZbfVeV
H Z]ZR^ PcVdè _

New Academic Building Preliminary Design:
2 Story Steel Framed, Slab on Grade Building founded
on Granular Soils with Localized Organic Material
FRTf]ej AUgZd`c Md AdY]Vj Sf]]ZgR_

NReYR_LR_V
MReYVh NZTY`]d
Jf deZ_PRc]RaZR_`

New Academic Building Preliminary Design:
2 Story with Basement, Steel Framed Building founded on Bedrock
FRTf]ej AUgZd`c Md AdY]Vj Sf]]ZgR_

DcVh F`cVde
H Vde]Vj NfY_
A_UcVd OeVc`

New Academic Building Preliminary Design:
3 Story, Steel Framed, Slab on Grade Building founded on Sand Soils
with Localized Debris Fill
FRTf]ej AUgZd`c Md AdY]Vj Sf]]ZgR_

JRT` S HRccV]d` _
E^ Z]j Lj _TY
BdR_U` _ MRcT` f i
MReYVh STRgRcUR

SENIOR DESIGN PROJECTS

Industrial Engineering and Engineering Management

SENIOR DESIGN PROJECTS   **STUDENT(S)**

Development and Implementation of an Electronic Data Capture System   A^ VV_ A]\YRSSRk
FRTf]ej AUg*d`c Dc SVj VU N*_R^
Sa`_d`c MVUec`_*Td I_T

Asset Loss Reduction   L*_UdVV DR_Z
FRTf]ej AUg*d`c Dc Jf]*V Dckj ^ R]d\Z
Sa`_d`c B`kkfè'dI_T.

Multivariate Short Run Statistical Process Control   CY*d*è aYVcDVdRfèV/]d
FRTf]ej AUg*d`c Dc KYR`[f_ (SèVgV_) LZ
Sa`_d`c U_*ZVU TVTY_`]` Q   `_*TSR   .

Mechanical Engineering

Design of an Environmental Chamber for an Ultrasonic Levitator

SENIOR DESIGN PROJECTS   **STUDENT(S)**

Design and Fabrication of a Dog Toy Fabrication Machine   BcV__R DZ]]_Vc
FRTf]ej AUgZd`c Dc G]V__GR]]VV
Sa`_d`c G``Uh Z]]I_UfdeeZVd, A__V KRS`dRj

Design, Testing, and Modification of SAE Baja Suspension Systems JVcV^j D`h_d
FRTf]ej AUgZd`cd: Dc A_eY`_j SR_eR^RcZR, Mc DRgZUGcVV_d]RUV

Design and Fabrication of a Tubing Straightener for HVAC Applications EeYR_FcVVU^R_
FRTf]ej AUgZd`c Dc G]V__GR]]VV
Sa`_d`c HZ]^``c, Bgj R_A]WR_`

Modification of a UAV for Small Package Delivery   BcZR_HV]]cZXV]
FRTf]ej AUgZd`c Dc RZTYRcU MZ_UV\

Design of a Rebound Test for Various Balls   J`dUR_H`]]Z_Xdh`ceY
FRTf]ej AUgZd`c Dc M`YR^^RU KY`dc h[VdZ

Aircraft in Distress Simulation   SeVgV_ JVWWcd`_
FRTf]ej AUgZd`c Dc CYRd]Vd R`TYV

Improving Rider Experience Through Redesign   R`SVœJV_\Z_d
of the Seat on an American Eagle Freedom Cycle
FRTf]ej AUgZd`c Dc MRcj G`]]Rc`
Sa`_d`c A^VcZTR_ ERX]V Cj T]Vd, TVddR NVh V]]

Design of Safety Candle Topper   PVeVcKV]]Vj
FRTf]ej AUgZd`c Dc G]V__GR]]VV

Fabricating of Gearbox and Frame for SAE Baja   TY`^RdKV__VUj
FRTf]ej AUgZd`cd: Dc A_eY`_j SR_eR^RcZR, Mc DRgZUGcVV_d]RUV

Crack Analysis of Ring Gears   J`dVaY LRC`fcdV
FRTf]ej AUgZd`c Dc RZTYRcU MZ_UV\
Sa`_d`c SZ`od\j AZcTcRWeC`ca`cReZ_, DRgZUBZ__Vj

Motorcycle Food Delivery System: Power Generation   JVR_-LfT LRLZSVœV
and Food Container Design
FRTf]ej AUgZd`c Dc G]V__GR]]VV
Sa`_d`c ACRES I_gVde^V_ed, JRgZcRZ W]Z

Mechanical Engineering

SENIOR DESIGN PROJECTS   **STUDENT(S)**

Turbojet Engine Analysis, Accessory Design and Testing   MZTYRV] LVaRXV
FRTf]ej AUgżd`cd: Dc RZTYRcU MZ_UV\, Dc JV__ZWcMR]]`gj

Design of a Cross-Transducer Acoustic Wave Separator   PVeVcL`^SRcU`
FRTf]ej AUgżd`cd: Dc BRœLZa\V_d, Dc DR_ZV]HReeV_
Sa`_d`c F]`DVdZX_S`_ZTd, Dc HR]eVcPcVdk Jc

Automation of Twisted Wire Brush Trimming   MZTYRV]MRdœZR_Z
FRTf]ej AUgżd`c Dc M`YR^^RUKY`dc h[VdUZ
Sa`_d`c SR_UVcd`_MRT]V`U, MRc\B`cdRcZ

Upstream Acoustic Particle Filtration for an Aerospace Application   SeVaYV_MVJZ_`
FRTf]ej AUgżd`c Dc JV__ZWcMR]]`gj
Sa`_d`c F]`DVdZX_I_T., HRj`_VTYcVdtYVc, Dc BRœLZa\V_d, Dc HR]eVcPcVdk

Design and Entrepreneurial Innovation of a Candle   A]jddR-M`_VeMZ]Vc
FRTf]ej AUgżd`c Dc CYRc]VdR`TYV

Weight Reduction and General Optimization of Multiple Subsystems   IR_OR\d
on the WNE SAE Mini Baja Vehicle
FRTf]ej AUgżd`cd: Dc A_eY`_j SR_eR^RcZR, Mc DRgżUGcVV_d]RUV

Design Verification and Implementation of a Data Acquisition   JRcVUO]V\dZR\
System for a Turbocharge Jet Engine
FRTf]ej AUgżd`cd: Dc RZTYRcU MZ_UV\, Dc JV__ZWcMR]]`gj

Hot and Cold Therapy Device   MZTYRV]PVœZ_`
FRTf]ej AUgżd`c Dc SRZUDZ_Z

Motorcycle Food Delivery System: Delivery Box Design   ASZXRZ]P`hVcd
FRTf]ej AUgżd`c Dc G]V__GR]]VW
Sa`_d`c ACRES I_gVde^V_ed, JRgżcRZ WZ

Redesign of Man-Transportable Robot Arm   SRcRY Rfa
FRTf]ej AUgżd`c Dc CYRc]VdR`TYV
Sa`_d`c PZTRœZ__j AœdV_R], HRf T. D`

Design and Construction of a Combat Robot   J`_ReYR_STYf]ek
FRTf]ej AUgżd`c Dc M`YR^^RUKY`dc h[VdUZ

Mechanical Engineering

SENIOR DESIGN PROJECTS **STUDENT(S)**

Design of a Fully Automated Bicycle Dynamometer:
Test Rig Design and Fabrication
FRTf]ej AUg7d c Dc M YR^ ^ RU KY dc h [VdJZ

MZTYRV]SVUJZ

Analysis of Vibrations and Their Effect on PEM Fuel Cell Performance
FRTf]ej AUg7d c Dc A_eY _j SR_eR^RcZR

Jf deZ_ SVJj^ R_

Design and Analysis of a Large-Scale Tennis Ball Pressurizer
FRTf]ej AUg7d c Dc SR7U DZ_Z

CYc7de aYVcSaVRc

Development of a Platform for the Cell Therapy Market
for FloDesign Sonics
FRTf]ej AUg7d cd Dc BRœL7a \V_d, Dc DR_7V] HReeV_
Sa _d c F] DVd7X_ S _7d, Dc H R]eVcPcVdk Jc

CYc7de aYVcUcTZf `]Z

9

Fre hman Pr   Inn va i n Pr je

Hands-on Experience Working on Real-world Engineering Projects

E_XZ_WcZ_X defUV_edReH VdeVc_NVh E_X]R_UU_ZgVcdZj c`]] f a eYVZc
d]VVgVcd è deRœRTeZ_X R_U eYZ_\Z_X]ZV ac`WddZ _R]dcZXYe\d/ ^ eYV V\de
URj. TYVj h`c\ `_ac`UfTeUVgV]`a^V_eac`[VTedfdZ_X \Vj V_XZ_WcZ_X
è`]dè UVgV]`a eYVZccVoVWRcTY R_UR_Rjd`dd\]d. TYc]ScRUg7h]Rjd
eYV VWf_UReZ _WcfUVcodeR_UZX Y`h eYVgRcZ fdUZdTZa]Z_dhZYZ_V_XZ-
_WcZ_X h`c\ è XVeYVcZ_dcVR]-h`cjURaa]ZTReZ_h YZ]VRjdd` YV]azZ_X eYV^
è^ReYeYVcZ_d]cvcdedR_UeR]V_edh ZeY eYV cZXYe^R['c

Honors Freshman Engineering Projects

Medtree: Universal Access System for Hospitals
College of Engineering: CRc ̀]Z_V BVde ̧ Rj R_ N` ̀ _, IdRSV]]V RZgRd
College of Business: AdY]Vj F ̀ cVde ̧ MRee K ̀ d] ̀ h d\Z
Faculty Advisors:

Freshman Engineering Projects

PROJECT TITLE/ADVISOR

Smart Bluetooth Push Lock, "Open Says Me"
FRTf]ej AUgżd`c Dc R`_MfdżR\

Protect-A-Pistol, "The Other Safety"
FRTf]ej AUgżd`c Dc R`_MfdżR\

DFH-3167, "Don't Sweat It"
FRTf]ej AUgżd`c Dc R`_MfdżR\

Cap'n Kleen!, "A New 21st Century Way of Cleaning your Hands"
FRTf]ej AUgżd`c Dc R`_MfdżR\

BLUE-SWITCH, "One Switch, Two Switch, Red Switch, BLUE-SWITCH"
FRTf]ej AUgżd`c Dc R`_MfdżR\

Mr. Sunshine, "The Device that Brightens Days, and Saves Energy"
FRTf]ej AUgżd`c Dc R`_MfdżR\

Awaken!, "The Quicker Getter Upper"
FRTf]ej AUgżd`c Dc R`_MfdżR\

Jazz Hands
FRTf]ej AUgżd`c Dc BVYkRU BVY_żR

WatchDog Security System
FRTf]ej AUgżd`c Dc BVYkRU BVY_żR

STUDENT(S)

Mj]Vd B`fTYRdU
A_UdVh F`]Mj
H ż]]żR^ JV_dV_
KVgż_KV__fdV

AdYè_B`fcS`__Rżd
Tj]VcC]ż_è_
RjR_D`_RYfV
SèVaYV_GżRccfdd`

JR^Vd BfT\ż_XYR^
CRdVj F]j__
KRc]HVc^R_
J`dYfR L``^żd

A_UdVh CRaa`]R
A_UdVh Kżc\Sj
H ż]]żR^ KcRd`gVT
A_żdY PRèV]

A_èY`_j DVPRdbfR]V
ARc`_FRSVc
GRSc\ż]R`UcżXfVk
EcżT SYż]jf\

R`SVœHR^V]
NżTY`]RdJf_bfVe
SYV]Sj LfT\Vc-GV_ę]V
PRœżT\LfkZ

R`SVœMRddR`
CYc\dè aYVcOfRc]Vd
DRgżURR\gżTR
Jfdeż_RżTYRdUd`_

BR]Rkd Bfdk_jR\
SèVaYV_E]\ż_d
Lf\V LR_XV]żVc
KVgż_TRè_

Pcż]R_\R GV`cXV
H Vdè_Lf___żV
Kż^SVcjP`ThżVdk
MRèèVVh TR]S`e

Freshman Engineering Projects

PROJECT TITLE/ADVISOR   **STUDENT(S)**

The Bike Directional
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

TY`^RdDVœZgR_
SéVgV_FVœVZcR
AjRUFZ]V^SR_

The Hug Vest
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

DRjè_RBRœ`hd
J`dVGRcTZR
KRTYRj NVh^R_
DR_ZV]HVcV_d\Z

Physical Therapy Touchboard
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

MfYR__RUA]dRSZXYZ
BV_[R^Z_BVR_V
ARc`_FVœR_èV
SVR_R`dd`

Smart Measuring of Glass Transition Temperature of Polymers
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

CYœdèaYVcCRdV]]R
SéVaYV_EdaZ_R]
C`]Sj S\Z]è_
CRœVcTYVœRf]e

The Light-Cycle
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

RRTYV]Bc`d_R_
A]V\dR_UcCR]TRX_`
R`SVœHRddR_
JRT`S Lj_XUR]

Intelligent Reflection
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

IdRZRdC`]`^SR_Z
BV_[R^Z_ITV^R_
E]ZVdVcR`UcZXfVk
AUR^TVdeR

gLock
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

AfdeZ_BRRT\V
DR_ZV]KZ]]R^
LVVPVœZ_XVc
NZTY`]RdRZgVe

The Hands Free Toilet Cleaner
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

CYœdeVR_CYR_U]Vc
MZTYRV]SV]]Vœd
HZ]]R^SYVUU
HZ]]R^JR^VV_

Clear Sight
FRTf]ej AUgZd`c Dc BVYkRU BVY_ZR

C`gjAdUV_
MRèeVh L`_X
A_UcVh NRf^VT
J`dVaYRfZk

Freshman Engineering Projects

PROJECT TITLE/ADVISOR

STUDENT(S)

ERBS: Electromagnetic Repulsion Breaking System

XY Gyro-Cam

TempTechs

Fall Sensor Vest

InFlight

BANC Monitors

Heads Up Helmet Sensor

Smart Medicine Cabinet

Carmon—Carbon Monoxide Detector for Cars

Freshman Engineering Projects

PROJECT TITLE/ADVISOR

babyBeat—Baby Heart Rate Monitor
FRTf]ej AUgZd`c Dc SeVgV_ N`œYcfa

IceTop—Smart Laptop Cooler
FRTf]ej AUgZd`c Dc SeVgV_ N`œYcfa

Super Solar Trackomatic—Solar Panel Position Controller
and Power Optimizer
FRTf]ej AUgZd`c Dc SeVgV_ N`œYcfa

Form Aide—Weight Lifting Trainer
FRTf]ej AUgZd`c Dc SeVgV_ N`œYcfa

The Smart Shooter Tutor: A Device for the Development of Hockey Skills
FRTf]ej AUgZd`c Dc MReeYVh R`^`dVc

ICanSee Cane: An Edge Sensing Cane for the Visually Impaired
FRTf]ej AUgZd`c Dc MReeYVh R`^`dVc

The Perfect Step: A Pressure Sensor Matrix to Correct Gait
FRTf]ej AUgZd`c Dc MReeYVh R`^`dVc

M.A.R.S (Magazine Auto-Locking Rifle System):
A Smart Lock Mag for Gun Safety
FRTf]ej AUgZd`c Dc MReeYVh R`^`dVc

Tic-Tac-Toe: Competitive Score Keeping Yard Game
FRTf]ej AUgZd`c Dc MReeYVh R`^`dVc

SmartFind: A Smart Device to Find Your Most Cherished Everyday Objects
FRTf]ej AUgZd`c Dc MReeYVh R`^`dVc

STUDENT(S)

JV__RY BdV__R_
SR^fV]CRè_
DR_ZV]PRdRUZd`
A]ViR_UVcRR]dè_

M`YR^^VU A]RddRW
EcZT Dc`k
J`dVaY MRœèTTZR
LV'BdR_MfddZ

BcZ_DfW\
MRih V]]JR^Vd
JR^VdKRd]
CYcZdeR_TY`^ad`_

GRgZ_C`]hV]]
EkV\ZV]KfV_kZ
JRT`S LRFVccZVdV
CYRUMTKV__R

SRScZ_RAc^V_è
Tj]VcHZ_Vd
DRgZUK]Vj^^R_
TcV_eR`SZd`_

Hf_èVcC`T\d
HVkDf_TR_
AœeV^P`edfcdRj
BcZR_GR]VdZR_`

NRèVB]R_TYVeeV
J`VC`__`cd
LVUXV_Lf_j
KRèV]j_PcZ^^Vc

JZ^^j B]RT\
CRœeVcDRgZd
DV]R_VjSV]R_Zd
A]ViGRcY`]

GZ__jLR]f^^R
HZ]]Rgj NRcR_[`-MV]ZR
Afdz_SeVWgVd

M`YR^VU A]bRURdZ
H Z]L`jU
A_UcVh SaRUR
JRd`_TYVcZRf]e