

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

In [2]:

```
data=pd.read_csv('F:\Desktop\headbrain.csv')
data.head()
```

Out[2]:

	Gender	Age Range	Head Size(cm^3)	Brain Weight(grams)
0	1	1	4512	1530
1	1	1	3738	1297
2	1	1	4261	1335
3	1	1	3777	1282
4	1	1	4177	1590

In [32]:

```
x=data['Head Size(cm^3)'].values
y=data['Brain Weight(grams)'].values
mean_x=np.mean(x)
mean_y=np.mean(y)
print(mean_x)
print(x)
print(mean_y)
```

```
3633.9915611814345
[4512 3738 4261 3777 4177 3585 3785 3559 3613 3982 3443 3993 3640 4208
 3832 3876 3497 3466 3095 4424 3878 4046 3804 3710 4747 4423 4036 4022
 3454 4175 3787 3796 4103 4161 4158 3814 3527 3748 3334 3492 3962 3505
 4315 3804 3863 4034 4308 3165 3641 3644 3891 3793 4270 4063 4012 3458
 3890 4166 3935 3669 3866 3393 4442 4253 3727 3329 3415 3372 4430 4381
 4008 3858 4121 4057 3824 3394 3558 3362 3930 3835 3830 3856 3249 3577
 3933 3850 3309 3406 3506 3907 4160 3318 3662 3899 3700 3779 3473 3490
 3654 3478 3495 3834 3876 3661 3618 3648 4032 3399 3916 4430 3695 3524
 3571 3594 3383 3499 3589 3900 4114 3937 3399 4200 4488 3614 4051 3782
 3391 3124 4053 3582 3666 3532 4046 3667 2857 3436 3791 3302 3104 3171
 3572 3530 3175 3438 3903 3899 3401 3267 3451 3090 3413 3323 3680 3439
 3853 3156 3279 3707 4006 3269 3071 3779 3548 3292 3497 3082 3248 3358
 3803 3566 3145 3503 3571 3724 3615 3203 3609 3561 3979 3533 3689 3158
 4005 3181 3479 3642 3632 3069 3394 3703 3165 3354 3000 3687 3556 2773
 3058 3344 3493 3297 3360 3228 3277 3851 3067 3692 3402 3995 3318 2720
 2937 3580 2939 2989 3586 3156 3246 3170 3268 3389 3381 2864 3740 3479
 3647 3716 3284 4204 3735 3218 3685 3704 3214 3394 3233 3352 3391]
1282.873417721519
```

In [36]:

```

n=len(x)
num=0
den=0
for i in range(n):
    num+= (x[i]-mean_x)*(y[i]-mean_y)
    den+= (x[i]-mean_x)**2
b1= num/den
b0= mean_y-(b1* mean_x)
print(b1,b0)

```

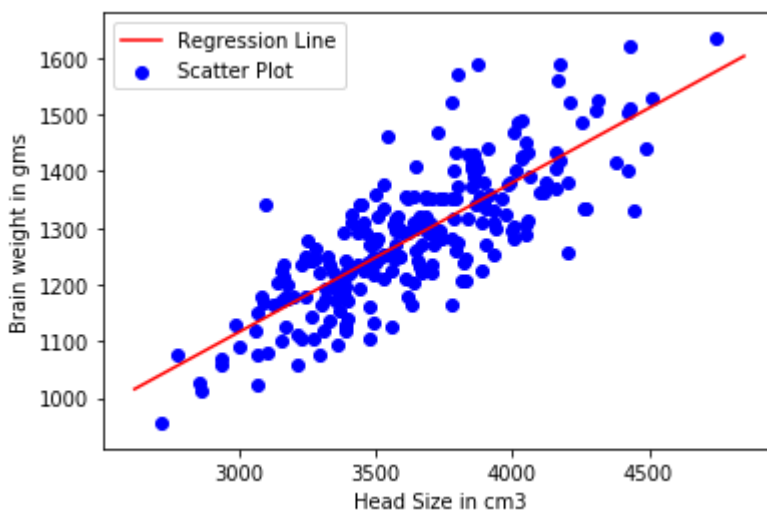
0.26342933948939945 325.57342104944223

In [34]:

```

max_x=np.max(x)+100
min_x=np.min(x)-100
X=np.linspace(min_x,max_x,1000)
Y=b0+b1*X
plt.plot(X,Y,color='red',label='Regression Line')
plt.scatter(x,y,color='blue',label='Scatter Plot')
plt.xlabel('Head Size in cm3')
plt.ylabel('Brain weight in gms')
plt.legend()
plt.show()

```



In [37]:

```

rmse=0
for i in range(n):
    y_pred=b0+ b1*x[i]
    rmse += (y[i]- y_pred)**2
rmse=np.sqrt(rmse/n)
print(rmse)

```

72.1206213783709

In [38]:

```
def model_prediction(x):  
    b1=0.26342933948939945  
    b0=325.57342104944223  
    y_pred=b0+b1*x  
    return y_pred
```

In [39]:

```
x=np.random.randint(100,10000,size=10)  
for i in x:  
    print("for head size=",i)  
    print("The brain weight is",model_prediction(i))
```

```
for head size= 4433  
The brain weight is 1493.35568300595  
for head size= 8713  
The brain weight is 2620.83325602058  
for head size= 4073  
The brain weight is 1398.5211207897662  
for head size= 1242  
The brain weight is 652.7526606952763  
for head size= 2835  
The brain weight is 1072.3955985018897  
for head size= 7544  
The brain weight is 2312.884358157472  
for head size= 8550  
The brain weight is 2577.894273683807  
for head size= 6490  
The brain weight is 2035.2298343356447  
for head size= 286  
The brain weight is 400.9142121434105  
for head size= 4347  
The brain weight is 1470.7007598098617
```

In []: